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H. C. DAWSON.


The Hog Book

Embodying the experience of fifty
years in the practical handling of
swine in the American cornbelt

By H. G. DAWSON



CHICAGO:
THE BREEDER'S GAZETTE



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INTRODUCTION.

The reader will realize that to give an exhaustive treatise on the hog business would be practically impossible, and that the very mass of such information, were it given, would leave him in doubt and confusion concerning the practical application of what he had read.

I only give in the following pages that which I have received. It has all been gained through the experience of a life devoted almost entirely to the live stock business. I believe that this common-sense review of my experience will be of value, but I write with no idea that I am beyond making mistakes or learning new things. I would have no one construe me as being above criticism. I naturally expect many fellow-breeders and feeders to disagree with me on certain points. The hog business is so broad and so deep and intricate that no man ever can thoroughly master all its departments during a lifetime. And even after a man has devoted practically all of his active years to gaining this knowledge, and is enabled successfully to apply it to his own herds, he finds it a harder task yet to impart it to others through the medium of the printed page.

To my fellow-breeders and feeders I dedicate this

record of my experience, gained during 50 years spent in breeding and handling the great American hog. It is my hope that they may derive benefit from it and that its publication will ultimately result in the betterment of breeds and types and increased profits to producers.

In conclusion, I would remind you, no matter what or how much you read, study, hear, or see, the hard knocks of practical experience and close association with Mother Nature are the makers of successful swine raisers.

AUTOBIOGRAPHICAL.

It is with considerable diffidence, and with no conscious egotism, that I write of my work in hog raising. No one realizes better than myself that the credit of originating the Poland-China does not belong to any one man or set of men. Hundreds of men experimented in breeding during the '50's and '60's and I only claim to be one of the many who contributed to the origination and development of this popular, pork-producing breed.

I was born in 1839 between the Wabash and the old "Tippecanoe Battle Grounds," in Indiana. My ancestors were descendants of Francis and Ralph Dawson, who settled in Virginia and Maryland from England in 1632 and 1685 respectively. My ancestors were of the pioneer stock found in the vanguard of the movement over the mountains and down through the valleys of the Ohio. From all accounts they were all lovers of good stock, and tillers of the soil. So it was only natural that my father brought with him from Kentucky excellent representatives of different breeds, and that I, at an early age, began to take an interest in all the stock on the farm. My interest soon gravitated towards horses and hogs.

The prevailing type of hog during the '40's was

large, coarse, big-framed, many-colored and slow-maturing. The hogs were very prolific, were forced to shift for themselves almost entirely, and were given a short corn feeding for market. They arrived at finished maturity at from two to five years. In meat and product they varied much. As there was no ideal as to breed, color or conformation, every hograiser worked out his own solution by breeding and crossing various types. This was the era of experimentation. During it nearly all our American breeds were established.

My father, like his neighbors, sought to improve his swine by securing individuals of approved type from local herds, to cross on his own. Often the colors and types were so radically different from previous ones, or the breeding herd, that there was much conjecture as to the outcome of such breeding. Boy-like, I often asked my father questions along this line, many of which he was able satisfactorily to answer in both theory and practice. But a few of his experiments had left very painful memories. The main tendency, however, was toward betterment. When 17 years of age I was given a working interest in the farm, and I sought to establish a type that would fill the demands of the breeding and market pens. At fairs in Indiana and Ohio I found many promising individuals, and by careful selection, mating and care, I soon had a small herd of high quality for that period.

In 1860 I bought two sows of David Magie, which were entirely white in color, being somewhat sim-

ilar in conformation to a large-framed modern Chester White sow. These were known as Magie hogs and they and their progeny were bred to boars which were bred by John Milliken, W. W. Ellsworth and David Magie. These two original sows I called "Queens." All their progeny retained as brood sows were also given the name "Queen," and through the various bloodlines that have been in my herds of Poland-Chinas to the present time not a single link of the chain has been lost that connects the Queens of the '60's to the Queens of my 1910 herds.

In 1864 my first exhibition of swine was made at the Indiana State Fair. The type of my exhibit was very similar to that of Magie's and Harkrader's, mostly black with large white spots. At this fair I won some second and minor ribbons in competition with Magie, Tilford, Rice and others. In Magie's exhibit was a litter of pigs almost solid black with white markings, much like those seen at the present time. This litter won the first-prize over mine, and, being inquisitive, I asked "Uncle" David how he produced the black ground and white markings. His answer was, "My boy, when you have bred hogs as long as I have you will know how." But by much questioning and investigation I arrived at my own conclusion, and the following year at the same fair I exhibited a litter that was a facsimile of "Uncle" David's. It immediately attracted his attention and after he had bought the first-prize pig of this litter to use in his own herd

he asked me the same question I had asked him previously. I laughingly replied, "The same way you did, 'Uncle' David." Then I told him the facts, that the litter was sired by a big black Berkshire boar with upright ears and a conformation and markings similar to those of modern Berkshires. This hog was imported from England by J. A. Johnson, Green Hill, Ind. Many Poland-China breeders try to deny the infusion of Berkshire blood, but from personal observation I would assert that nearly all the breeders who originated the Poland-China used at least one dip of the black, upright-eared Berkshire in their work. It was not practiced much, if at all, after 1870.

Using the progeny of the two original sows, which I purchased of Magie, for the basis of my sow herd, I continued to secure boars of outstanding individual merit, from outside sources of the same breed and type. I continued annually to exhibit at Indianapolis, always winning a fair part of the ribbons. At the same time I sold many hogs of my breeding to breeders and farmers in Indiana, Ohio, Kentucky and Illinois. In 1873, following the instinct of my pioneer blood, I located in the then so-called desert of Nebraska. In spite of all the warnings and dire predictions of my friends, I took along the best individuals of my horses, cattle and hogs. And I have never had reason to regret the change in my base of operations. Nebraska was so new and undeveloped that it was a matter of considerable hardship to carry on a breeding and exhibiting

business with hogs; but I continued annually to exhibit at the state fair, from its inception during the later '70's to the present time. I cannot remember, in that period, either being absent or failing entirely to win a ribbon.

There was considerable agitation about records, and one was finally formed at Cedar Rapids, Ia., in 1878, called the American Poland-China Record Association. To this organization I gave aid and support, and recorded several animals in its first volume. Prominent among these were Poland Queen and Poland Queen 2d, which were direct descendants of the two original sows purchased of Magie in 1860, and a boar, Major Magie 47, whose date of farrow was unknown, being sired by Jim Traer, by Alexander, dam Black Bess. Major Magie's dam was Beauty, by General. All of these were bred by D. M. Magie. As there was no systematic way of keeping records in those days there was much confusion and difficulty in getting many hogs into the record. D. M. Magie was somewhat adverse to organized associations, as he felt piqued by their selection of the name Poland-China instead of Magie Hog. The result was ill-feeling for many years afterward.

There are other families of Poland-Chinas that antedate my own, and have had more influence in moulding and originating the breed. And there were, perhaps, a hundred other breeders who contributed as much as, or more than, I did, and I do not wish to be understood as attempting to de-

tract from the achievements of these men or the merits of their families of hogs. My greatest pride is to be classed as one of the men who worked consistently and diligently for more than 50 years with one breed, carrying the bloodlines of the original stock through the whole period. We worked for one type, that which is now known as the Breeders and Farmers' Type.

Back in the early days, when the Poland-China was being moulded into form, I recall personal acquaintance and dealings with many of the most prominent breeders, among them being David Magie, John Milliken, David Finch, John Salmon and J. B. Duffield, the breeder of Tom Corwin 2d, all of Ohio; W. W. Ellsworth, H. M. & W. P. Sisson, B. F. Dorsey, D. P. McCracken and J. N. McCreary, all of Illinois; and Daniel Drook and Rankin Baldrige of Indiana. At a later date I became acquainted with W. P. Hazlett of Missouri and John Gilmore, S. A. Knapp, and W. Z. Swallow of Iowa. There were many other breeders, perhaps more prominent than some I have named, but those mentioned I personally recall.

All through my life I have been actively engaged in the hog business, and have had more or less experience in every department. During the later '60's and early '70's I dealt extensively in butcher hogs. I bought them in droves, and after driving them overland to railroad stations, shipped them by rail to Buffalo, Cincinnati or Chicago. At the same time I was interested in a packing house at

Lafayette, Ind. I also continued shipping market hogs after coming to Nebraska, often shipping solid trainloads of cattle and hogs to the leading packing centers. After looking over my old account books I believe it safe to assert that I have bought and sold 500,000 hogs for shipping and slaughtering purposes. I estimate the number of hogs bred and raised under my supervision to be nearly 10,000 head, and as I have conducted many public sales during the last 20 years, buying and reselling pedigree Poland-Chinas, the total number of pedigree hogs handled under my supervision during the last 50 years is probably about 25,000, and figuring in all hogs in which I have had some sort of a partnership dealing or interest during my lifetime, I believe the total number will exceed one million head.

Before 1890 I depended mainly on selling my surplus breeding stock by attending various state fairs and by advertising in stock papers. Noting that the public sale method, employed in selling other breeds of live stock, was very successful, I planned to hold my first public sale of Poland-Chinas, and it took place during the fall of 1891. Since then I have depended on this method more than any other in disposing of the surplus breeding stock of my own herds.

During the '90's it became evident that a new type of Poland-China must be established, and with the co-operation of many of my fellow-breeders there was formed a type that is now known as the "big-type." For several years it was hard to dis-

pose of strongly-developed individuals of this type, and it was also very difficult to secure ribbons on them at fairs, in competition with the smaller and fancier type. So, as the mountain would not come to us, we arose to the occasion and went to the mountain. We consigned drafts of big-type hogs to public sales which were liberally advertised to occur at sale points in Iowa, the Dakotas, Missouri, Oklahoma, Kansas and Nebraska. These sales were successful, and a demand for a farmer's hog was created among farmers and breeders. As our best efforts had been put forth in breeding, feeding and exhibiting animals of this type, the successes of these exhibits also created a stronger interest in and demand for this type. Among the chief workers in this matter were Col. "Tom" C. Callahan and Col. Z. S. Branson. Two noted sires of the type were What's Wanted Jr. and Expansion. We attributed much of our success to advertising, and have found by actual experience that nothing pays better, when correctly placed and followed up. We always figure to spend from \$50 to \$300 for advertising each sale, according to the circumstances and location. We also carry several hundred dollars' worth of general advertising annually. Through this advertising I have sold hogs to nearly every state in the Union, besides sending consignments to Mexico, Canada, Argentina, South America and Africa. And even though I believe myself to be well-established in reputation among my fellow-breeders, I would never think of stopping the adver-

tising of my Poland-Chinas. To do so would be equivalent to my retirement from active participation in my life-long work. And that, so long as I have physical or mental energy, would be but little better than a living death.

It may be thought that I am an advocate solely of the big type Poland-China. This is erroneous, as I demand quality as well as size, and the farmer's pork hog has always been my ideal type. True all my efforts as a breeder and exhibitor have been with the Poland-China, but I have always been ready to recognize and believe in the good characteristics of other breeds. If the reader carefully will follow the narration of my experience he will, however, understand my selection of and adherence to the large type.

I believe it would not be out of place to mention my successes in the showrings and sale rings. The aggregate number of ribbons won in 50 consecutive years of exhibiting Poland-Chinas at leading western state fairs and expositions totals more than 1,000, and I never made a showing at any fair where I did not secure one or more first prizes. I have also had the pleasure of noting the winnings of many individuals of my breeding.

AGRICULTURE THE FOUNDATION.

No nation can long remain powerful that does not produce its own food. All wealth by the personal use of its symbols, gold and silver, gives neither life, health nor comfort, but agriculture gives all these to man and secures to his arm the powers of might and possession. Agriculture is the bed-rock of nations, and their prosperity largely is measured by the intelligence and industry of tillers of the soil. In ancient Rome and Greece agriculture became a lost art, and decadence was the result. Nations prosper that produce necessities in excess of the demands of their own people. This is shown in Germany, Russia and France and the promised assertions of power and influence in worldly affairs by the Chinese and Indian Empires. All of these countries with the United States are known as the greatest of agricultural nations, and either have, or promise to be, the controlling powers of the world.

Nature's creatures when wounded or physically weakened seek her healing powers, knowing that what she has once builded she alone can repair. Men are learning that the freest life is lived only in the country. Belated cries of "back to the soil" are the expressions of a man's folly. For the most part this state of mind is gained at periods too late in life for personal advantage.

Agricultural wealth accounts for our standing among nations. The world is beginning to recognize the importance of the development of agriculture. Nearly all our available lands are under cultivation, and the limit in quantity of production under existing methods is clearly marked. With our rapidly increasing population we shall soon be consuming more than we can produce, under existing conditions, and will be forced to be buyers. But the promises of agriculture are so great that if its art and science continue to be developed we shall always have ample food for our population. Stock husbandry, however, is declining in some regions, and this is economically unsound. The marked decreases in the number of breeding animals, with increased valuation per head, tells of wrong conditions. This must be remedied by our own generation. In large part this decrease is due to altered range conditions, increased cost of production and the desertion of farms by well-to-do farmers of middle age, who are flocking to towns and cities. No other branch of agriculture offers such large and steady returns as hograising with dairying. Conducted on modern lines, this combination, leading to intensification of the production of grain and forage, and involving the utilization of wastes and by-products, is a success.

Friction between producers and consumers is a condition of vital importance. To correct it we must cease blaming this class or that, as neither the packer, the railroad nor the manufacturer alone is

accountable, no more than is the farmer, the ranchman, the home banker, or the laboring man. Conditions must be brought about so that intensified farming may be practiced, landlordism checked, and the producing acres owned and tilled by producing people, so that production shall be high. Wealth alone can not produce food; it takes thought and labor and soil fertility to produce food and comforts for the farmer and his family and a surplus for the non-producing classes, with prices regulated by the law of supply and demand.

THE HOG BUSINESS.

There is probably no other class of live stock that offers greater returns upon the investment than hogs. And the hog itself is a necessary adjunct to any general-farming or live stock business, if the fullest profits are to be realized. No other farm animal can convert, so economically and profitably, the wastes and by-products of the farm into finished products of high quality and constant value throughout the year.

The increasing value of land, foodstuffs and labor is making it necessary that agriculture be henceforth a more scientific pursuit, in which the cost of production as well as the quality and quantity of the product, be considered, and the farm made to produce at its full capacity. This is true as well of the hog business. All its branches eventually converge into one ending, the finished product. That must in the end justify every other side of the business.

The first essential in the hog business is good seed, but it must be bred and developed by a man who takes an intelligent interest in raising the excellence of his type. Such men may be termed hog breeders, and to them must be given the credit of maintaining and improving the standards of all breeds.

Pork producers, on the other hand, are not attached to any one breed, but care more for type and producing qualities. Their seed is obtained largely from breeders, and by years of experience with all breeds and types most porkmakers have learned to be very practical in their selections. The majority of them are producing hogs that possess type rather than breed character; that can convert the by-products and feedstuffs of their farms into finished meats of the highest quality, in the least time, and at the least cost. The producer's pens are really an experiment farm upon which the breeder tries out his types and breeds, and he is guided greatly by the results of these experiments in his selection of types. As the result of these experiments and the interchange of experiences with breeders, producers are of the opinion that pure-bred or high-grade hogs of a quick maturing pork-type are the most profitable for their business.

The successes of breeders and porkmakers can be traced almost directly to their choice of, and adherence to, breed and type. Proper mating, proper care, proper feedstuffs are all essential, and no matter how well-bred a hog may be individually, the lack of any of these essentials will tend to upset the physiology of individuals and their progeny until marked degeneracy is accomplished. The tendency towards reversion is constant and must be constantly fought.

Over against these breeders and producers may be set a class of hograisers whose activities are al-

most entirely pernicious. These people—it is hard to find a suitable name for them—as a class conduct their business as a side-line or on the “root hog or die” basis, never giving it serious attention, unless, through their careless and ignorant methods in feeding and handling, their hogs develop fatal diseases, or when they are so fortunate as to have a good bunch of finished porkers ready to convert into dollars. Such men need the greatest awakening, for on them rests largely the responsibility for surpluses and shortages and the diseases of swine; their careless, indifferent, and oftentimes ignorant, methods of breeding, feeding and caring for hogs are perhaps the greatest menaces to the progress and health of all breeds.

So it is well for all men who plan to engage in the production of pork to weigh their qualifications. To be successful, much time, study and personal attention are required. Hogmen are neither born nor bred, but are generally created by the necessity of economical general-farming, where the hog is a necessary consumer of what would otherwise be waste. The hog will ever be the poor man’s friend, and will never become the rich man’s hobby. To the poor man he becomes at once a personal luxury and an investment that under good care and treatment will bring home many other comforts and necessities of life. Dollars will never produce ideal breeding or pork hogs, but ideal breeding and pork hogs will, with the proper personal study and care, produce dollars. So no matter what prices are paid

for individuals, their merits, feed and care determine almost entirely the successful outcome of the business.

It is not wisdom to assume that a few years' experience qualifies a man to speak exhaustively and authoritatively upon all phases of hog-raising, for even a lifetime's labor and association will not attain that goal.

No man can realize this better than do the old-time breeders, who in their mature years view the prejudices and listen to the theories propounded by the younger generation of hog men—not that we would assume to ridicule, for we would rather commend and admire their showing of zeal and spirit, for we too passed along the same roadway, learning by experience as they, and now we are free to confess, somewhat with shame, that we too were perhaps just as egotistic.

After all we all realize that of such men are the real hogmen made, who will in their maturer years realize as do we that the ways and endings of the hog business are many, intricate and varied and that its science will never be thoroughly mastered in a lifetime even by master breeders.

THE MAN.

The greatest qualification of a hograiser is a natural liking for all farm animals. Only a man who is perfectly at home tending stock and who takes actual pleasure in the care of his animals, will be able intelligently to note their progress and their response to feeding and general treatment. To be at home in the business a man must have common-sense and good judgment. He must be able to discern the merits of individuals, herds and breeds, and to foretell in large measure the results of mating individuals of different types and breeds. He should be conservative and possess an equable temperament, as the hog and many problems of its raising refuse to be hurried. He should also have considerable perseverance or else some results will outstrip his endurance—the proverbial driving of a pig to market being a case in point. The hograiser of course must be industrious and a lover of outdoor life, for the hog takes most of his time during daylight hours. It is less obvious but equally true that he must be an artist, that is to say, that he must use imagination, for his task is to create from his “raw material” a better and more profitable animal and that, of course, means using his imagination constructively. The hograiser should be economical in his business affairs, remembering in the

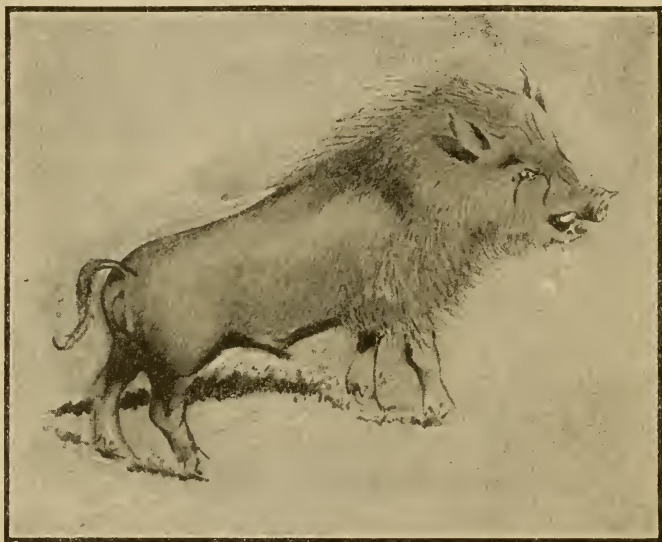
days of prosperity that extravagance will bring days of want. The hog business being generally built up from small beginnings, is open to the man of little capital and it is, in fact, better to start it on a small scale. To start at the top by paying high prices for breeding stock and investing much money and time before acquiring experience on a small scale is to make the worst possible start. The wise plan is to acquire experience from actual practice, on a small scale, of all things necessary to the successful carrying on of the business.

BREED HISTORIES.

The hog is scientifically classified as a genus of the Suidea branch of the Pachydermatous or mammal family. This branch is characterized by a short muscular snout, sensitive to touch and smell, and used in searching for food. Its members are four-footed and generally have four toes on each foot, with the front toes larger and bearing the weight, and the hind toes normally above the ground. The hog is considered the most omnivorous of all mammals.

The hog of the present day has two lines of ancestry. The first is the wild hog of Northern Europe and Northern Asia, still to be found unchanged in its original home; the second is the aboriginal hog of the southern latitudes. The wild hog of northern latitudes is *Sus Scofra*. Its size varies widely, according to location, feedstuffs and climate. Constitutionally, the wild hog is very strong, having great heart and lung capacity, being, in fact, generally twice as deep through the fore part as through the flank. The head is long and generally bears large tusks. It has heavy shields on the shoulders, which, with their necks, are well developed muscularly. The jowl is clean-cut, and the body close-coupled in the back, with a comparatively small loin and ham. The wild hog is of slow matur-

ity and often lives 25 or 30 years. It breeds once a year and produces a medium-sized litter. The young are mothered until four or five months of age, but protected until they have reached their full stature, which sometimes is not attained for three or four years.

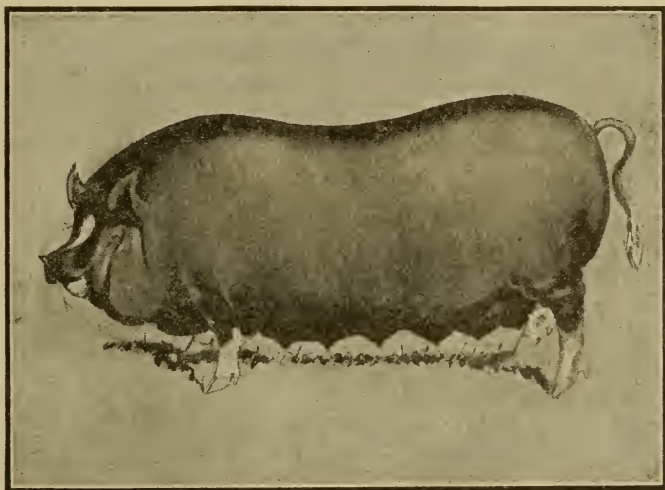


A WILD BOAR.

The other type from which modern breeds originated is the *Sus Indica*, an inhabitant of the warm southern latitudes of Europe and Asia. It is a smaller type than the northern hog, thin-skinned, early-maturing, fatter, of a finer quality and gentler disposition. The Siamese, Chinese and Neapolitan hogs were good examples of its descendants, and

they were used early in 1800 to secure maturing and fattening qualities in many American breeds.

While the hog is not native to America nor—is it thought—to Great Britain, these two countries must be given credit for all the leading breeds of recent and modern times. America secured the most of its original stock from Great Britain, and

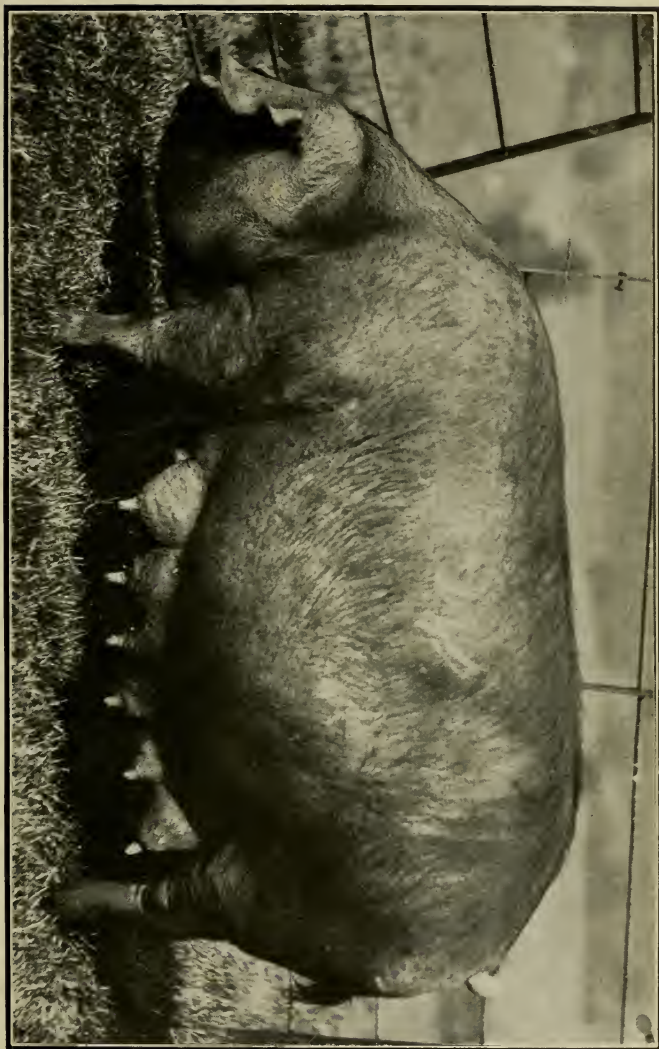


THE SIAMESE HOG.

the history of the development of swine is practically the same in the two countries. The old English hog is the original breed, the foundation of nearly all the late American and English types. According to the first authentic record of the hog's arrival in America, Columbus, in his second voyage to Cuba in 1493 brought over a few breeding indi-

viduals of a reddish caste, of Spanish origin and slow-maturing type. Other early voyagers brought individuals of widely different types to many places along the coast line of the New World during the beginning of the next century. But probably the first importations of any benefit were made by the English to the Virginia colonies in 1608, and to Massachusetts in 1624. Holland also sent hogs to Manhattan Island in 1625. Following these early importations came numerous others until our colonies had a fair representation of almost every type then existing in Europe. But the early settlers did not pay much attention to the uses or welfare of the hog, and for the most part allowed it to rustle at large, living in the woods, exposed to dangers and to the elements. Hogs did not attain much common development under such conditions, and they did not change materially until the colonies began to seek the power to govern themselves.

Peculiarly enough George Washington was the first importer of a highly-bred type of pork-producing hog, to be used in establishing a more profitable stock husbandry. This was during the 1760's; the hogs were from the estate of the Duke of Bedford, who had developed the type from the then existing English stock. The progeny of this importation became known as the Bedfordshires. During the years before and after the Revolutionary War our vessels of commerce brought importations of hogs from nearly every port of hograising countries. These were crossed on existing types, and the re-



AN ENGLISH LARGE BLACK DEEP-MILKING SOW.

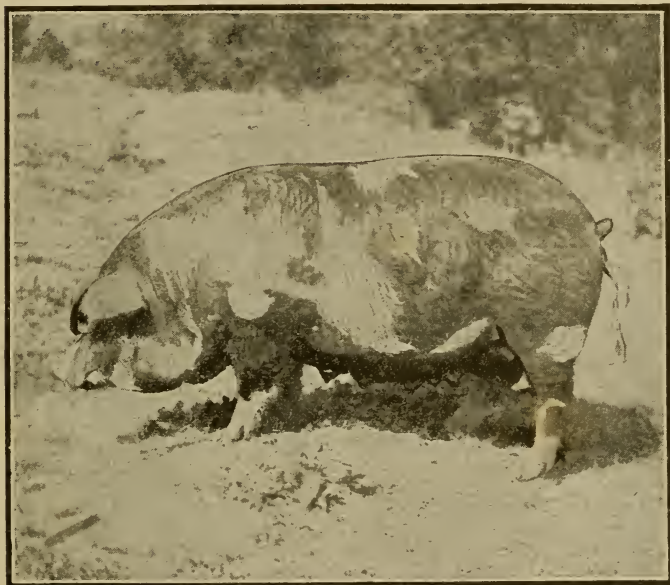
sults varied widely with each locality, developing types of different sizes, colors, shapes and values which are the basis of all the leading American breeds of today. These crosses eventually became known as the Bedfordshires, Chinas, old Berkshires, Irish Graziers, Red Rocks, Guinea Reds, Jerseys, old Yorkshires, Cheshires, Siamese, Suffolks, Chesters and Essex, and it was not until the period between 1830 and 1840 that they became distinct in breed, and attained their present stability.

New Jersey is credited with being the home of the Duroc-Jersey breed, and the Quakers with having produced the Chester White's original foundations. Poland-Chinas were developed in the valleys of Ohio. While the Berkshires are generally credited to England they received their greatest development in America. Several minor breeds have been developed in America, and others have been lately imported and developed more highly than they had been in their original homes.

POLAND-CHINAS.

In giving the history of the different breeds of hogs I cannot always speak from personal knowledge, and in many cases I draw freely upon accredited authorities. In the case of the Poland-Chinas, however, I write from my own observations and from information derived from breeders who were actually working on this type years before my time. The Poland-China is distinctively American in origin. It was developed into a distinct breed in

the Miami Valley of Ohio between 1830 and 1850. The foundation blood traces back to the early importations of the old Berkshires and old Bedfords. These were crossed and recrossed with other breeds and types, which were imported from the old world at this and later dates, and the result, during



A PIONEER POLAND-CHINA TYPE.

the early 1800's, was a scattered conglomeration of all sundry types, sizes and colors then existing in America. There were few families of hogs kept so pure in blood that they would even reproduce partial likenesses of themselves. After the Revolutionary War, pioneers blazed their way across the

mountains of Pennsylvania and Virginia and through the valleys of the Western Slope to the fertile lands of Kentucky, Ohio and Indiana. With the caravans of these early settlers were specimens of the prevalent breeds and types of stock from their homes and, as almost every locality along the coast-line of the earlier-settled states had a type or breed in some way different from any other, these settlers in time brought about wide differences in types. But as they learned of the fertility of the soil of these valleys and of its adaptability for the production of corn and pork, it became evident that they must secure a type better adapted to the land. Various experiments were made with the types then existing, and with imported individuals of pure breeding. The prevailing type was large, coarse, rough, slow-maturing, of various colors and markings, very prolific, free from disease, living for the most part primitively, and often not maturing into marketable pork until three or four years of age. In a few years the results of the endeavors of these breeders began to appear in certain types that established themselves. These gradually developed into a common type of much the same conformation, hardy, prolific, with earlier maturity and with good carriage. The latter quality was essential, as it was then customary to drive fattened hogs to market in droves. Lacking railroads or even—in bad weather—passable wagon roads, journeys of hundreds of miles had to be taken on foot.

In 1830 the predominating breeds in the Miami

Valley were, in the order named, Bedfordshire, China, Berkshire, Byfield, Big Spotted China, Irish Grazier and Russian. These were gradually blended into a new type by using the blood of the Siamese, Essex and Neapolitan Berkshires between 1830 and 1840.

The Bedfordshire was a large sun-fish type with



THE BEDFORDSHIRE HOG.

bones not very large, but credited with being an exceptionally good traveler; color, sandy, spotted or striped; large, flopping ears; maturing generally between three and four years of age.

The China was generally white, though sometimes spotted or sandy; an easier and earlier maturer than the Bedfordshire; larger and of finer quality; it had large, flopping ears. Its origination

is credited to Pennsylvania and, as was the Bedfordshire, it was brought to the Miami Valley by the first settlers.

The old Berkshire was similar in conformation to the Bedfordshire, both being descendants of the Old English hog. The Berkshire was of a more reddish or sandy cast; not inclined to be as spotted



THE OLD ENGLISH HOG.

as the Bedfordshire and sooner tending to a more distinctly solid color; of easier and earlier maturity. In the latter '50's and by the early '60's many families of these Berkshires were similar in type, conformation and color to present-day Berkshires. The early type and color of the Berkshire had much to do with fixing the solid black color and white markings of the Poland-Chinas during the '60's.

The Byfield was a large-framed, long-bodied, solid white hog, having a slightly-dished face, with large, flopping ears. This breed was said to have been evolved from the Bedfordshire, Old English and Chinese hogs, an ancestry similar to that of the big China. The Byfield, however, was a larger and



THE CHINESE HOG.

more coarsely-constructed type, and of slower maturity.

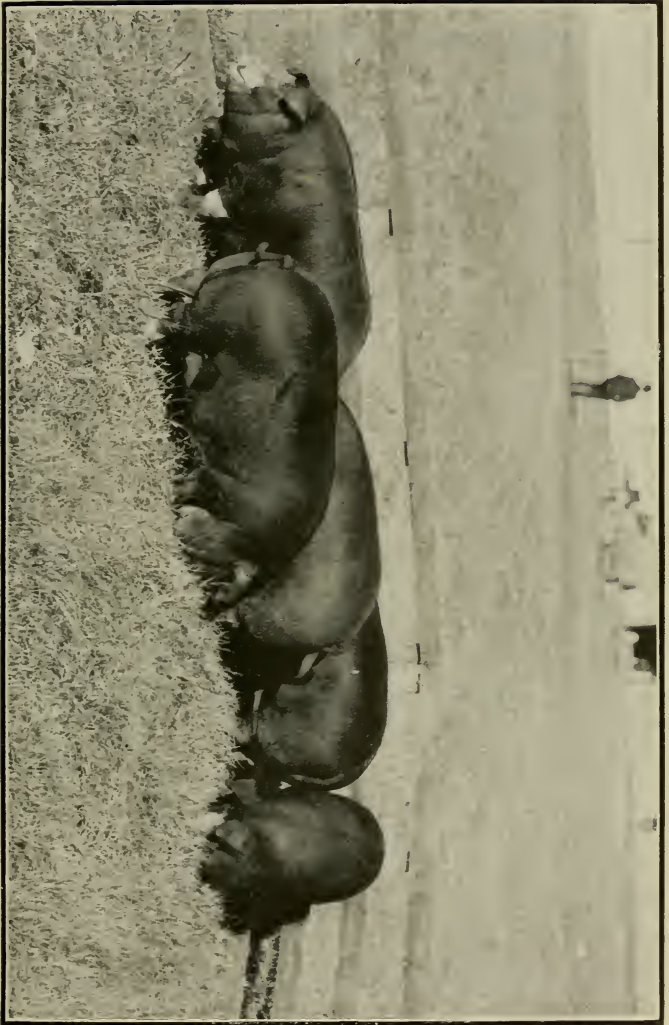
The Big Spotted China can hardly be called a distinct contributing breed, as it was really the forerunner of the Poland-China breed itself. The Poland-China was often known as the Big Spotted hog or Big Spotted Poland before being called the Magie hog, Warren County, Miami, or Poland. It had, however, a place in the formation of the breed.

The Irish Grazier was also of American origin, being, it is said, a blend of the Irish hog, the Yorkshire, the Berkshire, and the Suffolk, with domestic infusions of Chinas and others. The Irish Grazier was generally white, with but few black spots; fairly early in maturing; a good grazer and fatterer, when in market condition presenting a fairly well-



THE MAGIE HOG.

made pork form. The Russian was a large, coarse, white hog of good length; long in the head; long, slim ears, pointed forward; legs long, with medium bone; deep sides with a bad back, shed-roofed and narrow; slow-maturing; producing meat of a coarse quality; very prolific. The Siamese was a small, black-haired, thin-skinned, upright-eared, sway-



SHOWYARD POLAND-CHINAS.

backed, quick-maturing type, often with white markings on the legs; fairly prolific. The infusion of this blood did much to improve the maturing and feeding qualities of the Poland-Chinas of that time.

As the Poland-China hog was evolved by so many men, with so many different foundations and infusions, and so much crossing, inbreeding and line breeding, it is impossible to trace its lineage back to the primitive hog. Families of hogs were often named after the breeder, or after the locality in which they were bred, and many differently-named hogs were virtually of the same breed. The Poland was named after its originator, a Pole of Butler Co., O. The original stock was imported from England, and was of the old Berkshire breed. By judicious mating and handling it was developed into a type of earlier maturity, and a better pork animal. The type was large and in color similar to the old Berkshire, being sometimes almost solid red, with sandy or black spots. The Poland was also prolific and of rugged constitution.

The blending of all these breeds and types eventually began to form a distinct type, a large-framed, good-boned, fairly quick-maturing, spotted, droop-eared hog, possessing excellent meat-and-lard-developing qualities, vigorous, prolific and constitutionally strong. In the early '60's this type was known under many different names, the most common being the Magie hog, Miami Valley, Warren County, Butler County, Poland and China. During this time the Essex and black up-eared Berk-

shires were crossed on the partially-fixed Poland-Chinas, to fix their color and markings. The infusion of this blood also gave the Poland-China quicker maturity and better feeding qualities. It proved to be the last outside infusion necessary in the formation of the breed, and the main endeavor of the future was to intensify and fix its type and color. I do not believe that any outside blood has been used since the '60's. Many families did not be-



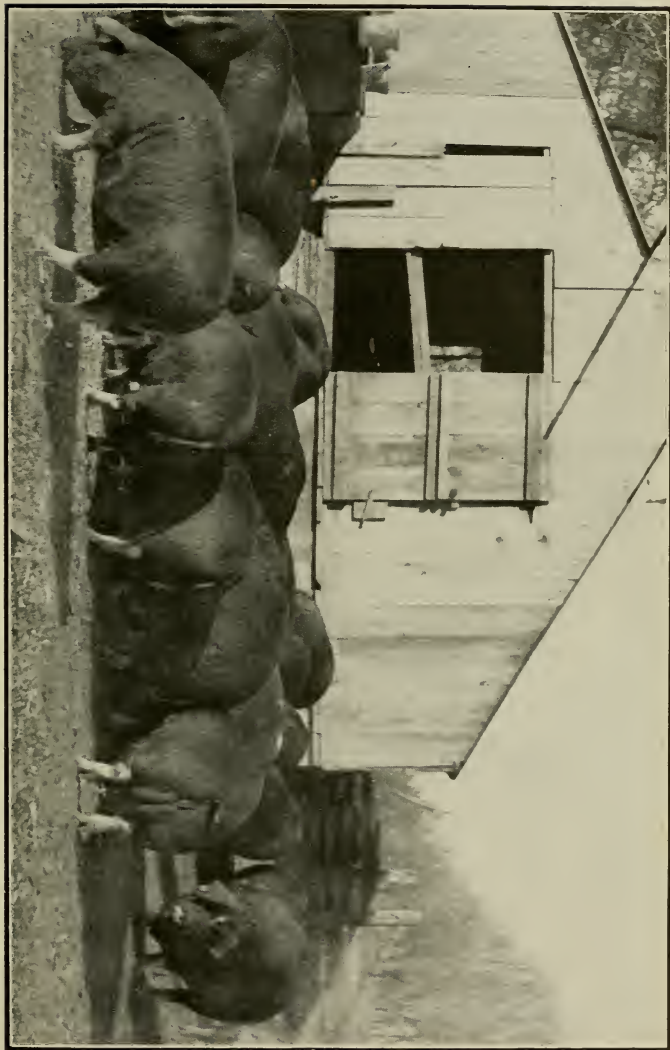
POLAND-CHINAS BRED BY THE AUTHOR.

come solid black, that is, black except for the usual six white markings, until the '80's, and even at present there are families of spotted Poland-Chinas, and it is still possible, by certain matings, eventually to breed any Poland-China strain back to a spotted and colored type.

I have heard so many different versions of the origin of the name Poland-China that it is hard to give credit to any alleged originator of it without

seeming to ignore some other breeder. Personally I do not consider the name Poland-China appropriate or that the early so-called breeds had as much to do with forming the present Poland-China as did many other types of that day. The name Poland-China was finally given the breed by a convention of swine breeders at Springfield, Ill., in 1870. There were contentions, and exhibitions of envy at the meeting, due to attempts to name the type after certain breeders or localities, but the compromise name was chosen. It was ratified by a swine breeders' convention at Indianapolis in 1872, and was subsequently accepted by nearly all breeders. David Magie, however, remained outside of the record and organization during the remainder of his active years in the breeding business with his "Magie" hogs. But all hog men must give him credit for his part in the origination and promotion of the Poland-China. True, there were other pioneer breeders, as John Milliken and John Harkrader, in his time, but to "Uncle" David much honor is due. And the history of the Poland-China would not be complete if no mention were made of that great sire Tom Corwin 2d, which demonstrated himself so prepotent in fixing color and type, and was himself the turning stone and bedrock of a breed distinct in type and color. So far as Poland-Chinas are concerned, he may be termed the father of the breed.

The "Ohio Poland-China Record"—the first of its kind—was started during the early '70's, but



A DROVE OF BIG-TYPE POLAND-CHINAS.

was not established until 1877. Breeders in the Middle West followed it with the organization of the "American Poland-China Record" in 1878 at Cedar Rapids, Ia. Its first volume was issued in 1879. Since that time the National, Central, Standard, and Southwestern Poland-China Records have been established, but the Central and Ohio have been merged into the National and the Southwestern into the American.

The record associations must be given much credit for holding and improving the high standard of excellence of the Poland-China for early maturity, prolificacy, pork and lard production, and adaptability to American agricultural conditions.

While the Poland-China belongs to the fat or lard-type, some families have been developed into producers of bacon. It is not naturally of an active disposition, yet the hogs take sufficient exercise properly to stimulate their appetites and digestion. They are unsurpassed feeders.

Many breeders, growing dissatisfied with the existing type and the evident tendency to decrease its size and usefulness, set about to hold or establish a type that would be in conformity with the demands of the times. Breeders did not ignore the score card, but the two factions interpreted it differently, the big-type breeders placing more importance on size, development, production, prolificacy and adaptability. Many of these breeders developed families to an extreme, but the main tendency among them has been to retain quality with size, and to be closely

in line with the highest requirements of the breed. Breeders of the smaller and more compact type interpreted the score card to be very strong on minor or fancy points and those that would give early maturity, refinement of character and superior quality of meat. Breeding for this type had a tendency to lower prolificacy and make the type strictly fat-producing, incapable of profitable feeding after it attained 300 pounds in weight. The Poland-China score card follows:

	Perfect Score
Head	4
Eyes	2
Ears	2
Neck	2
Jowl	2
Shoulders	6
Chest	12
Back and loin.....	14
Sides and ribs.....	10
Belly and flank.....	4
Ham and rump.....	10
Feet and legs.....	10
Tail	1
Coat	3
Color	3
Size	5
Action and style.....	3
Condition	2
Disposition	2
Symmetry of points.....	3
Perfection	100

HEAD—Head should be broad, even and smooth between and above the eyes; slightly dished, tapering evenly and gradually to near the end of the nose; broad lower jaw, head inclined to shortness, but not enough to give the appearance of stubby nose; and in male, a masculine expression and appearance. *Objections*—Head long, narrow between the eyes; nose uneven and coarse; too large at the muzzle or the head too short; not full or high above the eyes, or too much wrinkled around or above the eyes.

EYES—Full, clear, prominent and expressive. *Objections*—Dull expression, deep set or obscure. Sight impaired by wrinkles, fat or other cause.

EARS—Ears attached to the head by a short, firm knuck, giving

free and easy action; standing up slightly at the base to within two-thirds of the tip, where a gentle break or droop should occur; in size neither too large nor too small, but even, fine, thin, leaf shape; slightly inclined outward. *Objections*—Large, floppy, straight, upright or coarse; knuck long, letting the ear droop too close to the head and face, hindering the animal of free use of the ears.

NECK—Short, wide, even, smooth, well arched; rounding and full from poll to shoulder, with due regard to the characteristics of the sex. *Objections*—Long, narrow, thin and drooping from the shoulder to the poll, with unevenness caused by wrinkles or creases.

JOWL—Full, broad, deep, smooth and firm, carrying fullness back to near point of shoulders, and below line of lower jaw so that the lower line will be as low as breast-bone when head is carried up level. *Objections*—Light, flabby, thin and wedge-shaped, deeply wrinkled, not drooping below line of lower jaw, and not carrying fulness back to shoulder and brisket.

SHOULDERS—Broad and oval at the top, showing evenness with the back and neck, with good width from the top to the bottom, and even smoothness extending well forward. *Objections*—Narrow at the top or bottom; not so deep as the body; uneven width. Shields on pigs under eight months of age, or showing too much shield at any age.

CHEST—Large, wide, deep and full; even under-line to the shoulder and sides with no creases; giving plenty of room for heart and other organs, making a large girth, indicating much vitality. Brisket smooth, even and broad, wide between legs, and extending well forward, showing in front. *Objections*—Pinched appearance at the top or bottom, or tucked in back of fore-legs; showing too narrow between the legs; not depth enough back of the shoulder. Brisket uneven, narrow, not prominent.

BACK AND LOIN—Broad, straight or slightly arched, carrying same width from shoulder to ham, surface even, smooth, free from lumps, creases or projections, not too long, but broad on top, indicating well-sprung ribs; should not be higher at hip than at shoulder and should fill out at junction with side so that a straight-edge placed along at top of side will touch all the way from point of shoulder to point of ham; should be shorter than lower belly line. *Objections*—Narrow, creased back of shoulders, swayed or hollow, drooping below a straight line; humped or wrinkled; too long or sun-fish-shaped; loin high, narrow, depressed or humped up; surface lumpy, creased, ridgy or uneven, width at side not so much as shoulder and ham.

SIDES AND RIBS—Sides full, firm and deep, free from wrinkles; carrying size down to belly; even from ham to shoulder. Ribs of good length, well sprung at top and bottom. *Objections*—Flat, thin, flabby, pinched, not so full at bottom as at top; drawn in at shoulder so as to produce a crease, or pinched and tucked up and in as it approaches the ham; uneven surface; ribs flat or too short.

BELLY AND FLANK—Belly broad, straight and full, indicating capacity and room, being about the same or on a level at the flank with the under chest-line. Under-line straight or nearly so, and free from

flabby appearance. *Objections*—Belly uneven and flabby, or apparent looseness in the make-up. Pinched up in the flank or flanked too high.

HAM AND RUMP—Hams broad, full, deep and long from rump to hock; fully developed above and below, being wide at the point of the hip, carrying width well down to the lower part of the hams; fleshy, plump, rounding, fulness perceptible everywhere. Rump rounding and gradually sloping from the loin to the root of the tail; broad and well developed all along from loin, and gradually rounding to the buttock; lower front part of ham should be full, and stifle well covered with flesh. Even width of ham and rump with the back, loin and body; even a greater width as to females not objectionable. *Objections*—Ham, short, narrow, too round or slim; not filled out above or below, or unshapely for deep meat; nor so wide as the body, back or loin; too tapering or small. Rump narrow or pointed, not plump or well filled, or too steep from loin to the tail.

LEGS AND FEET—Legs medium length, straight, set well apart and squarely under body, tapering, well muscled and wide above knee and hock; below hock and knee round and tapering, capable of sustaining weight of animal in full flesh without breaking down; bone firm and of fine texture; pasterns short and nearly upright. Feet firm, short, tough and free from defects. *Objections*—Legs long, slim, coarse, crooked; muscles small above hock and knee; bone large, coarse; as large at foot as above knee; pasterns long, slim, crooked or weak; the hocks turned in or out of straight line; legs too close together; hoofs long, slim and weak; toes spreading or crooked or unable to bear weight of animal without breaking down.

TAIL—Tail of medium length and size, smooth and tapering well, and carried in a curl. *Objections*—Coarse and long without a curl; short, crooked or stubby; too small, even, not tapering.

COAT—Fine, straight, smooth, lying close to and covering the body well; not clipped, evenly distributed over the body. *Objections*—Bristles, hair coarse, harsh, thin, wavy or curly; swirls, standing up, ends of hair split and brown, not evenly distributed over all of the body except belly. Clipped coats should be cut 1.5 points.

COLOR—Black, with six (6) white points: Tip of tail, four white feet and white in face on the nose or on the point of lower jaw; all to be perceptible without close examination. Splashes of white on the jaw, legs or flank, or a few spots of white on the body not objectionable. *Objections*—Solid black, white mixed or sandy spots; speckled with white hairs over the body; mottled face of white and black, hair mixed, making a grizzly appearance.

SIZE—Large for age. Condition, vigor and vitality to be considered. There should be a difference between breeding animals and those kept or fitted for the show, of at least 25 per cent in size. In show condition, or when fat, a two-year-old boar should weigh not less than six hundred (600) pounds, and a sow not less than five hundred (500) pounds. Boar one year and over, four hundred (400) pounds; sow, three hundred and fifty (350) pounds. Boar, eighteen months, five hundred (500) pounds; sow, four hundred and

fifty (450) pounds. Boars and sows six months old, not less than one hundred and sixty (160) pounds. All hogs in just fair breeding condition, one-fourth less for size. The keeping and chance that a young hog has cut a figure in his size and should be considered, other points being equal. Fine quality and size combined are desirable. *Objections*—Overgrown; coarse, flabby, loose appearance, gangling, hard to fatten; too fine, undersize; short, stubby, inclined to chubby fatness; not a hardy, robust animal.

ACTION AND STYLE—Action vigorous, easy and graceful. Style attractive; high carriage; and in males, testicles should be prominent and of about the same size, and yet not too large and pouchy. *Objections*—Clumsy, slow, awkward movement; low carriage; waddling or twisting walk; a seeming tired or lazy appearance; not standing erect and firm.

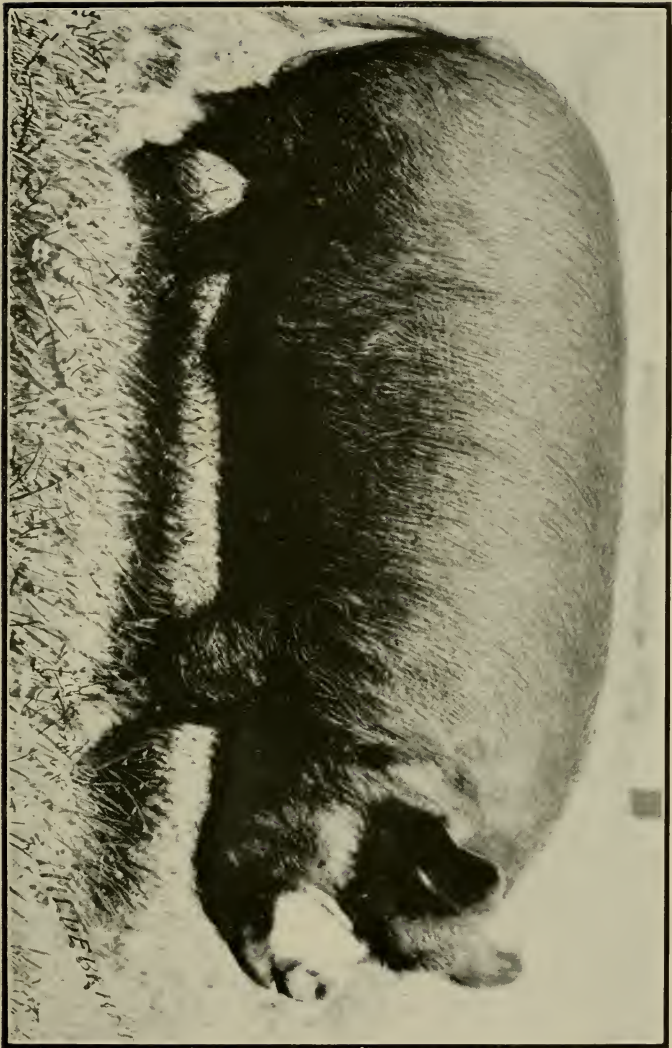
CONDITION—Healthy, skin clear of scurf, scales and sores; soft and mellow to the touch; flesh fine; evenly laid on and free from lumps and wrinkles. Hair soft and lying close to body; good feeding qualities. *Objections*—Unhealthy, skin scaly, wrinkled, scabby or harsh; flabbiness or lumpy flesh; too much fat for breeding. Hair harsh, dry and standing up from body; poor feeders; deafness, partial or total.

DISPOSITION—Lively, easily handled and seemingly kind, responsive to good treatment. *Objections*—Cross, sluggish, restless, wild or of a vicious turn.

SYMMETRY OR ADAPTATION OF POINTS—The adaptation of all the points, size and style combined to make the desired type or model.

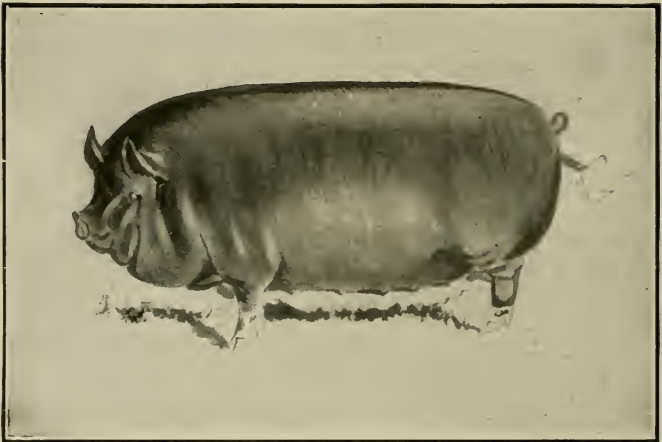
BERKSHIRES.

This is perhaps the oldest distinct breed of hogs, originating in Berkshire, England, more than 100 years ago. The Old English hog was its foundation stock and, as England imported hogs from almost every part of the world to cross on its pioneer herds, many of its counties each developed a breed that was distinctly local. So at an early date there were several breeds in England of similar conformation, but differing in name and color. Prominent among these were the Berkshire, the Bedfordshire, the Yorkshire, the Leicester and the Essexshire. These were developed largely by the mixed breeding of Siamese, Neapolitan, Indian and



A MODERN BERKSHIRE TYPE.

Chinese stock. The Berkshire and Bedfordshire hogs were originally very similar. The former is described as a large animal, with good length and depth and fairly good bone, coarse, flopping ears, the ham and shoulder thick and fairly well filled, a broad full back, and good bacon sides. However, the type was slow in maturing and rarely rounded into a finished form before three or four years of



THE NEAPOLITAN BERKSHIRE.

age. The quality of meat, however, was excellent for that day.

America imported individuals of this type in 1770 and as late as 1830; but during that time many English and American breeders were endeavoring to establish a distinct breed by infusions and out-crosses of the Siamese, Neapolitan and Chinese. This eventually resulted in a type very like the



AN ENGLISH TYPE OF BERKSHIRE SOW.

standard Berkshire of today, but between 1830 and 1850, many breeders overdid its development by using too much of the southern blood, and created a short, fine-boned, quickly-maturing type. For a while following, the Berkshire's popularity was on the wane, but other breeders soon transformed the type into the long, deep-sided, short, broad, and dish-faced animal that is typical of the breed today. While there were families of the old Berkshire as late as 1840, I do not believe that there were any outside infusions of blood since 1840 in the families which eventually have become the standard modern Berkshire. Perhaps many of these families can trace their lineage back pure in blood and breeding for 120 years. England was generally considered the headquarters of the greatest Berkshire show-yard families, but the improvements and developments made in this breed in America during the past 25 years have give us precedence over the old country. To such breeders as N. H. Gentry and A. J. Lovejoy must be given credit for bringing this breed back into popularity as a type for pork production of high quality. Other American breeds received many of their good qualities through the infusion, in their formative periods, of the old Berkshire blood. The Poland-Chinas, especially, were bettered between 1850 and 1865 by infusions of Berkshire blood.

The Berkshire has long held its place as an unsurpassed producer of meat and lard of the highest quality. It is prolific and widely distributed.



A TRIO OF CHAMPION BERKSHIRE BARROWS.

Many great sires and dams have contributed to the betterment of the breed, perhaps the most prominent being the sires of the Longfellow family bred by N. H. Gentry.

The Berkshires are of the lard type, although they are cutters of high-quality bacon, and adapt themselves to use for either lard or bacon. In some regions they are bacon hogs, while in others, where conditions are different, they give satisfaction as producers of lard. Bred pure for a long period, the Berkshire is noted for prepotency. American Berkshires excel the Berkshires of England. Being hardy in constitution and of a naturally active disposition, the Berkshire makes a profitable hog in the cattle-feeding lot. The marked difference between the Berkshire and any other lard-type breed is its dished face. The snout is very short. The Berkshire score card follows:

	Perfect Score
COLOR—Black, with white on feet, face, tip of tail and an occasional splash on the arm.....	4
FACE AND SNOUT—Short, the former fine and well dished, and broad between the eyes.....	7
EYE—Very clear, rather large, dark hazel or gray.....	2
EAR—Generally almost erect, but sometimes inclined forward with advancing age; medium size, thin and soft.....	4
JOWL—Full and heavy, running well back on neck.....	4
NECK—Short and broad on top.....	4
HAIR—Fine and soft, medium thickness.....	3
SKIN—Smooth and pliable.....	4
SHOULDER—Thick and even, broad on top, and deep through chest..	7
BACK—Broad, short and straight; ribs well sprung, coupling close to hips	8
SIDE—Deep and well let down; straight on bottom lines.....	6
FLANK—Well back and low down on leg, making nearly straight line with the lower part of side.....	5
LOIN—Full and wide.....	9

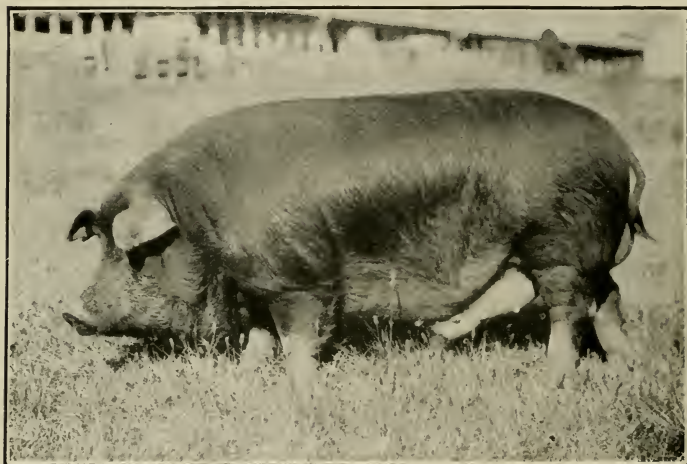
HAM—Deep and thick, extending well up on back, and holding thickness well down to hock.....	10
TAIL—Well set up on back; tapering and not coarse.....	2
LEGS—Short, straight, and strong, set wide apart, with hoofs erect and capable of holding good weight.....	5
SYMMETRY—Well proportioned throughout, depending largely on condition	6
CONDITION—In a good, healthy, growing state; not over-fed.....	5
STYLE—Attractive, spirited, indicative of thorough breeding and constitutional vigor	5
Perfection	100

DUROC-JERSEYS.

Although the Duroc-Jersey is of American origin, it is difficult to trace its pedigree, as several parts of the Old World had red hogs, and several different importations were made of them to America and distributed in different localities. It is even said that the hogs brought over by Columbus were of a reddish cast. It is certain that Spain at that time had a breed of red hogs, and so did Great Britain; but perhaps the first authentic record we have of the ancestors of the Duroc-Jersey is of their being brought to America by slave-trading vessels plying between Guinea and New Jersey early in the seventeenth century. Their progeny became known as the Red Hogs, Guinea Reds, and eventually as Jersey Reds.

The Berkshire of that time was reddish in color, and in some localities red hogs were bred together to fix the color. There is record of such types being bred in Connecticut, Massachusetts and New York between 1820 and 1830 under the names of Red Berkshires and Red Rocks in the first two states, and Durocs in the last named. Individuals of these

breeds were crossed with the Jersey Reds, and in 1837 Henry Clay of Kentucky imported from Spain several red hogs. Their progeny was distributed over the hog country at that time, and there is record of their being crossed with the Red Berkshire, Jersey Red, and other red pioneer breeds. In 1852 Daniel Webster imported from Portugal several



A SHOWYARD DUROC-JERSEY BOAR.

red hogs and in turn their progeny was crossed on the red-colored types developed from previous intelligent breeding.

From this time on it may be said that the Duroc-Jersey became a distinct breed, but as in the case of the Poland-Chinas each locality had a different name for it, such as Jersey in New Jersey, Red Rock in New England, Clay Rock in Kentucky, Duroc,

A PRIZE-WINNING DUROC-JERSEY.



Red Berkshire in New York, Red Graziers on account of the Irish Grazier cross, Red Guineas, on account of their nativity, and Frank hogs. There was need of an organization that should effect unity of purpose in breeding operations. In 1870 breeders began to merge into two distinct factions; one named the breed the Jersey Red and the other the Duroc, the latter suggested by a prominent breeder of red hogs at Saratoga, N. Y., in honor of his trotting horse. In 1877 at a convention of breeders at Saratoga, N. Y., the name Duroc was adopted together with a standard of excellence. Since that time the advancement of the breed has been rapid. The Durocs then were described as being of medium size, with short straight legs, compact in build, medium-sized head and ears; wide back, with full shoulders and ham; quality of meat good for that time; color generally cherry red. The Jersey Reds were markedly different in conformation, being very large and growthy, slow to mature, with great length of body, large, flopping ears, long legs, long noses and a rangy appearance. The color was generally red, but some were sandy or spotted with white. Their hair was coarse and inclined to stand erect and be bristly on the neck. The quality of meat was not high, but as the hogs were constitutionally strong and grew to a large size they were popular with many breeders. In 1883 the American Duroc-Jersey Swine Breeders' Association was formed in Chicago, and the name of Duroc-Jersey was adopted, and since that time so well have the advocates of the



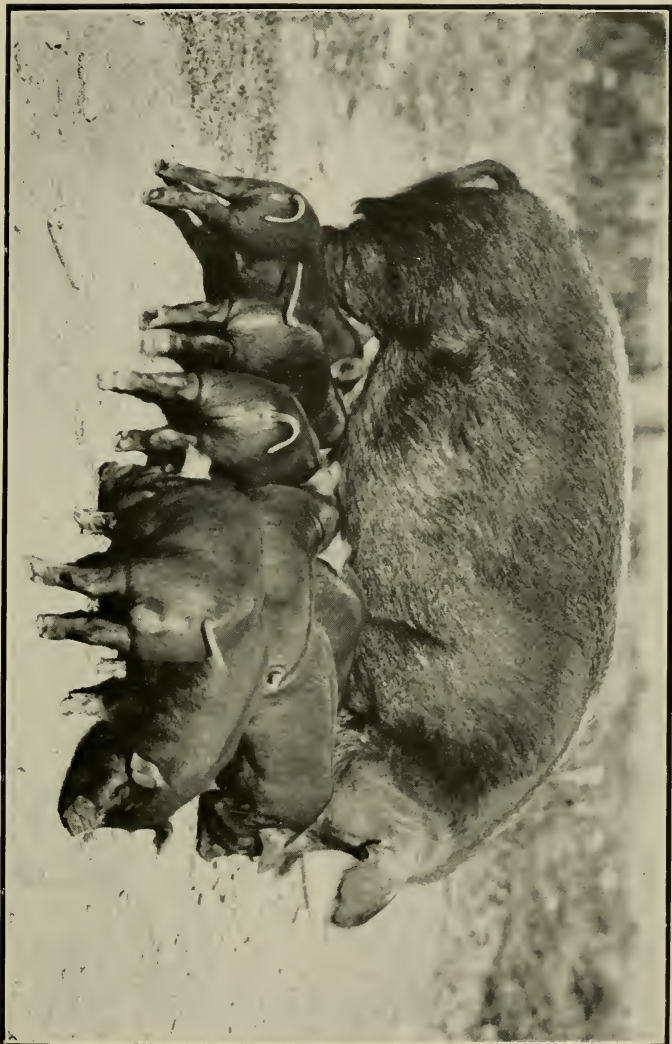
A CHAMPION DUROC-JERSEY SOW.

breed battled for supremacy that at present its representatives number second to Poland-Chinas. In 1891 the National Duroc-Jersey Record Association was organized.

Duroc-Jerseys, belonging to the lard-type, in disposition are generally active, being considered good feeders and grazers. Marked improvement has been made in the breed during the last few years. Its origin accounts for its ruggedness, good size and length, and these characteristics earned the breed steady popularity. Among Poland-China and Berkshire breeders there is a tendency to develop types of greater size but still retaining quality; while Duroc-Jersey breeders are diminishing size but intensifying maturity and quality. In conformation Duroc-Jerseys do not differ materially from Poland-Chinas.

The Duroc-Jersey score card is subjoined:

	Perfect Score
Head and face.....	4
Eyes	2
Ears	2
Neck	2
Jowl	2
Shoulders	6
Chest	12
Back and loin.....	15
Sides and ribs.....	8
Belly and flank.....	6
Hams and rump.....	10
Legs and feet.....	10
Tail	1
Coat	2
Color	2
Size	5
Action and style.....	4
Condition	4
Disposition	3
Perfection	100



DUROC-JERSEY SOW AND LITTER.

DISQUALIFICATIONS: Form—Ears standing erect; small cramped chest, and crease back of shoulders and over back so as to cause a depression in the back easily noticed; seriously deformed legs, or badly broken-down feet. Size—Very small, or not two-thirds large enough as given by the standard. Score—Less than 50 points. Pedigree—Not eligible to record.

DETAILED DESCRIPTION: Head and Face—Head small in proportion to size of body; wide between eyes; face nicely dished (about half way between a Poland-China and a Berkshire), and tapering well down to the nose; surface smooth and even. *Objections*—Large and coarse; narrow between the eyes; face straight; crooked nose, or too much dished.

EYES—Lively, bright and prominent. *Objections*—Dull, weak and obscure.

EARS—Medium, moderately thin, pointing forward, downward and slightly outward, carrying a slight curve; attached to head very neatly. *Objections*—Very large, nearly round, too thick, swinging or flabby; not of same size; different position and not under control of animal.

NECK—Short, thick and very deep and slightly arching. *Objections*—Long, shallow and thin.

JOWL—Broad, full and neat; carrying fullness back to point of shoulders and on a line with breast-bone. *Objections*—Too large, loose and flabby; small, thin and wedging.

SHOULDERS—Moderately broad, very deep and full; carrying thickness well down and not extending above line of back. *Objections*—Small, thin, shallow; extending above line of back. Boars under one year old heavily shielded.

CHEST—Large, very deep, filled full behind shoulders, breast-bone extending well forward so as to be readily seen. *Objections*—Flat, shallow, or not extending well down between fore-legs.

BACK AND LOIN—Back medium in breadth; straight or slightly arching; carrying even width from shoulder to ham; surface even and smooth. *Objections*—Narrow, crease behind shoulders; swayed or humped back.

SIDES AND RIBS—Sides very deep, medium in length; level between shoulders and hams, and carrying out full down to line of belly. Ribs long, strong, and sprung in proportion to width of shoulders and hams. *Objections*—Flabby, creased, shallow, and not carrying proper width from top to bottom.

BELLY AND FLANK—Straight and full and carrying well out to line of sides. Flank well down to lower line of sides. *Objections*—Narrow; tucked up or drawn in; sagging or flabby.

HAMS AND RUMP—Broad, full and well let down to the hock; buttock full and coming nearly down and filling full between hocks. Rump should have a round slope, from loin to root of tail; same width as back and well filled out around tail. *Objections*—Ham narrow, short, thin, not projecting well down to hock; cut up too high in crotch. Rump narrow, flat or peaked at root of tail; too steep.

LEGS AND FEET—Medium size and length, straight, nicely tapered;

wide apart and well set under the body; pasterns short and strong. Feet short, firm, and tough. *Objections*—Legs extremely long, or very short, slim, coarse, crooked; legs as large below knee and hock as above; set too close together; hocks turned in or out of straight line. Feet, hoofs long, slim and weak; toes spreading or crooked.

TAIL—Medium; large at base and nicely tapering, and rather bushy at end. *Objections*—Extremely heavy; too long and ropy.

COAT—Moderately thick and fine; straight, smooth and covering the body well. *Objections*—Too many bristles; hair coarse, harsh and rough, wavy or curly; swirls, or not evenly laid over the body.

COLOR—Cherry-red, without other admixtures. *Objections*—Very dark red or shading brown; very pale or light red; black spots over the body; black flecks on belly and legs not desired but admissible.

SIZE—Large for age and condition. Boar two years old and over should weigh 600 pounds; sow same age and condition, 500 pounds. Boar 18 months, 475 pounds; sow, 400 pounds. Boar 12 months, 350 pounds; sow, 300 pounds. Boar and sow pigs six months, 150 pounds. The figures are for animals in a fair show condition. *Objections*—Rough and coarse and lacking in feeding qualities.

ACTION AND STYLE—Action vigorous and animated. Style free and easy. *Objections*—Dull or stupid; awkward and wabbling. In boars, testicles not easily seen nor of same size or carriage; too large or only one showing

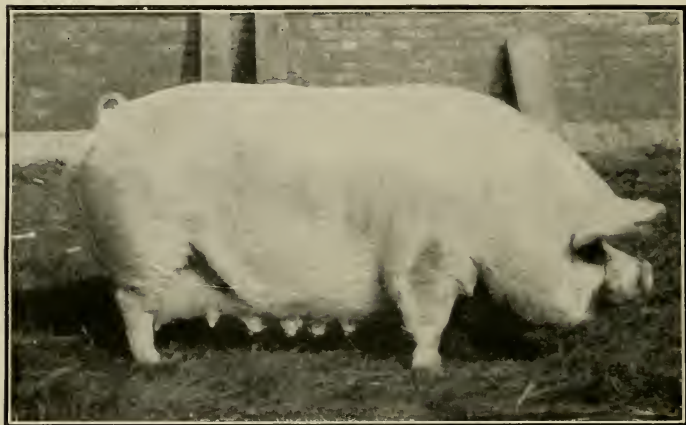
CONDITION—Healthy; skin free from scurf, scales, sores and mange; flesh evenly laid over the entire body and free from any lumps. *Objections*—Unhealthy, scurfy, scaly, sores, mange; too fat for breeding purposes; hair harsh and standing up; poor feeders.

DISPOSITION.—Very quiet and gentle; easily handled or driven. *Objections*—Wild, vicious or stubborn.

CHESTER WHITES.

Originating in Chester Co., Pa., the Chester White's foundation stock is enmeshed in historical uncertainties, but it is known that the old Bedfordshire was being bred in that region at the time. In 1818 Capt. James Jeffries imported white hogs from Lincolnshire, England, and at about the same time English and Chinese hogs were imported from England. Both were generally white in color, but both sometimes had black or blue spots over the body. There were white hogs in Pennsylvania previously to these importations, but they were of a slow-

maturing type. Using blood from these various stocks, there was finally developed a type that was white in color and free from spots. It soon gained favor in Pennsylvania and some parts of Ohio. In conformation its representatives varied from an extremely large, coarse, slow-maturing type to a small, compact and quick-fattening pattern. Some of this blood was used in moulding the Poland-China breed,



CHESTER WHITE SOW.

and it is evident that the foundation work for both breeds was along the same lines, except wherein color was established.

The Chester White is one of the oldest distinct breeds of swine in America, and has made its greatest development as a pork-producer during the past 30 years. Its history shows contentions among breeders based on the name and type, but the breed

is loyally supported by its advocates. The men who have done much to popularize the Chester White are the Todds of Ohio, who originated the type known as Todd's Improved Chester between 1860 and 1870. This strain eventually became known as the Improved Chester White. Then L. B. Silver of Ohio developed a type from foundation stock secured



CHESTER WHITE BOAR.

from the Todds, his aim being to fashion an ideal pork hog. Considerable success attended his efforts, and his type became known as the Ohio Improved Chester. A record association was formed in 1884.

The Chester Whites classify with the lard breeds. In disposition they are not active, but possess good feeding qualities. In conformation they vary from extremely long, coarse individuals to more refined

specimens, the latter being the rule in the leading herds of the cornbelt. Following is the breed score card:

	Perfect Score
Head and face.....	4
Eyes	2
Ears	2
Neck	2
Jowl	2
Shoulders	6
Chest	9
Back and loin.....	15
Sides and rib.....	8
Belly and flank.....	6
Hams and rump.....	10
Feet and legs.....	10
Tail	1
Coat	2
Color	5
Size	5
Action and style.....	4
Condition	4
Disposition	3
Perfection	100

DISQUALIFICATIONS: Form—Upright ears; small cramped chest; crease around back of shoulders and over the back, causing a depression easily noticed; feet broken down, causing the animal to walk on pastern joints; deformed or badly crooked legs. Size—Chuffy, or not two-thirds large enough for age. Condition—Squabby fat; deformed, seriously deformed; barrenness; total blindness. Score—Less than 60 points. Pedigree—Not eligible to record. Color—Black or sandy spots in hair.

DETAILED DESCRIPTION: Head and Face—Head short and wide; cheeks neat but not too full; jaws broad and strong; forehead medium, high and wide. Face short and smooth; wide between the eyes; nose neat and tapering and slightly dished. *Objections*—Head long, narrow and coarse; forehead low and narrow; jaws contracted and weak. Face long, narrow and straight; nose coarse, clumsy or dished like a Berkshire.

EYES—Large, bright, clear and free from wrinkles or fat surroundings. *Objections*—Small, deep or obscure; vision impaired in any way.

EARS—Medium size, not too thick; soft; attached to the head so as not to look clumsy; pointing forward and slightly outward; fully under the control of the animal and drooping so as to give a graceful appearance. *Objections*—Large, upright, coarse, thick, round, too small; drooping too close to the face, animal not being able to control them.

NECK—Wide, deep, short, and nicely arched. *Objections*—Long, narrow, thin, flat on top; tucked up; not extending down to breast-bone.

JOWL—Full, smooth, neat and firm; carrying fullness back to shoulder and brisket when the head is carried up level. *Objections*—

Light; too large and flabby; rough and deeply wrinkled; not carrying fullness back to shoulder and brisket.

SHOULDERS—Broad, deep and full, extending in a straight line with the side, and carrying size down to line of belly. *Objections*—Narrow at top or bottom, not full nor same depth as body; extending above line of back; shields on boars too coarse and prominent.

CHEST—Large, deep and roomy, so as not to cramp vital organs; full in girth around the heart, the breast-bone extending forward so as to show slightly in front of legs, and let down so as to be even with line of belly, showing a width of not less than seven inches between fore-legs of a full-grown hog. *Objections*—Narrow, pinched; heart girth less than flank girth; too far let down between fore-legs; breast-bone crooked or too short.

BACK AND LOIN—Back broad on top, straight or slightly arched; uniform width, smooth, free from lumps or rolls; shorter than lower belly line; same height and width at shoulder as at ham; loin wide and full. *Objections*—Back narrow, creased back of shoulders; sun-fish shaped, humped, swayed, too long, or lumpy rolls; uneven in width; loin narrow, depressed or humped.

SIDES AND RIBS—Sides full, smooth, deep, carrying size down to belly; even with line of ham and shoulder; ribs long, well sprung at top and bottom, giving hog a square form. *Objections*—Flat, thin, flabby, compressed at bottom; shrunken at shoulders and ham; uneven surface; ribs flat and too short.

BELLY AND FLANK—Same width as back, full, making a straight line and dropping as low at flank as at bottom of chest; line of lower edge running parallel with sides; flank full and even with body. *Objections*—Belly narrow, pinched, sagging or flabby; flank thin, tucked up or drawn in.

HAMS AND RUMP—Ham broad, full, long, wide and deep, admitting of no swells; buttock full, neat and clean, thus avoiding flabbiness; stifle well covered with flesh, nicely tapering towards the hock. Rump should have a slightly rounding shape from loin to root of tail; same width as back; making an even line with sides. *Objections*—Hams narrow, short, not filled out to stifle; too much cut up in crotch or twist, not coming down to hocks; buttocks flabby. Rump flat, narrow, too long, too steep, sharp or peaked at root of tail.

LEGS AND FEET—Legs short, straight, set well apart and squarely under body; bone of good size, firm, well muscled; wide above knee and hock; below knee and hock round and tapering, enabling animal to carry its weight with ease; pastern short and nearly upright. Feet short, firm, tough and free from defects. *Objections*—Legs too short, long, slim, crooked, too coarse; too close together; weak muscles above hock and knee; bone large and coarse without taper; pasterns long, crooked, slim like a deer's; hoofs long, slim, weak; toes spreading, crooked or turned up.

TAIL—Small, smooth, tapering, well set on; root slightly covered with flesh; carried in a curl. *Objections*—Coarse, long, clumsy, set too high or too low; hanging like a rope.

COAT—Fine, straight or wavy; evenly distributed and covering the body well; nicely clipped coats no objection. *Objections*—Bristles, hair coarse, thin, standing up, not evenly distributed over all of the body except the belly.

COLOR—White (blue spots or black specks in skin shall not argue impurity of blood). *Objections*—Color any other than white.

SIZE—Large for age and condition; boars two years old and over, if in good flesh, should weigh not less than 500 pounds; sow same age and condition, not less than 450 pounds. Boars 18 months old in good flesh should weigh not less than 400 pounds; sows, 350. Boars 12 months old, not less than 300 pounds; sows, 300. Boars and sows six months old, not less than 150 pounds each; and other ages in proportion. *Objections*—Overgrown, coarse, uncouth, hard to fatten.

ACTION AND STYLE—Action easy and graceful, style attractive; high carriage; in males, testicles should be readily seen; same size and carriage. *Objections*—Sluggish; awkward, low carriage, wabbling walk; in males, testicles not easily seen, not of same size or carriage, or only one showing.

CONDITION—Healthy; skin clear and bright, free from scurf and sores; flesh fine and mellow to the touch; evenly laid on and free from lumps; good feeding qualities. *Objections*—Unhealthy; skin scaly, scabby or harsh; flesh lumpy or flabby; hair harsh, dry and standing up from body; poor feeders; total deafness.

DISPOSITION—Quiet, gentle and easily handled; with ambition enough to look out for themselves if neglected. *Objections*—Cross; restless, vicious or wild; no ambition.

HAMPSHIRE.

Of English origin, the Hampshire traces back to the old English hog. There is evidence that the original English Thin-rind and Essex hogs were similar in conformation and color markings to the Hampshire, which reached the United States through several sources, one being by way of Canada into New York, where the breed became known as the Ring Middle or Hampshire. The name Hampshire is English. Individuals of this breed were brought to Boone Co., Ky., in 1835 by Major Gannett. Their descendants for a number of years were kept pure and became popular with many breeders in Kentucky, Indiana, Illinois and Ohio, but they



HAMPSHIRE BARROWS.

eventually became so mixed with other breeds that it was hard to find a pure-bred Hampshire in the '60's. A direct importation of Hampshires from England to Massachusetts was made in 1800, and the progeny remained pure for some time, but eventually became scattered and mixed with other breeds. There yet remained individuals here and there of the popular type and color markings, and these were selected to perpetuate the breed. In the '70's there were several herds along the Ohio River known as Thin-rinds. These continued to exist without much special improvement until the American Hampshire Swine Record Association was established in Boone Co., Ky., in 1893. This organization began vigorously to advertise the breed, and its work has made it increasingly popular.

Hampshires are a combination type, being adapted for both bacon and lard. In disposition they are fairly active and good feeders, producing meat of high quality. In pattern the hogs are of good length and depth, showing good firm smooth sides, with fairly well-developed hams, strong-arched backs and narrow clean-cut heads. A distinguishing characteristic is the color, which is black excepting a white belt eight to ten inches wide round the body over the shoulders with forelegs included. Following is the standard of perfection:

DISQUALIFICATIONS: Color—Spotted or more than two-thirds white. Form—Any radical deformity, ears very large or dropping over eyes, crooked or weak legs or broken-down feet. Condition—Seriously impaired or diseased, excessive grossness, barrenness in animals over two years of age, chuffy or squabby fat. Size—Not two-thirds standard weight. Pedigree—Not eligible to record.

Perfect
Score.

HEAD AND FACE —Head medium length, rather narrow, cheeks not full; face nearly straight and medium width between the eyes, surface even and regular.....	4
<i>Objections:</i> Head large, coarse and ridgy; nose crooked or much dishd.	
EYES —Bright and lively, free from wrinkles or fat surroundings..	2
<i>Objections:</i> Small, deep or obscure, or vision impaired by fat or other cause.	
EARS —Medium length, thin, slightly inclined outward and forward.	2
<i>Objections:</i> Large, coarse, thick, large or long knuck, drooping or not under good control of the animal.	
NECK —Short, well set to the shoulders, tapering from shoulder to head	2
<i>Objections:</i> Long, thick or bulky.	
JOWL —Light and tapering from neck to point, neat and firm.....	2
<i>Objections:</i> Large, broad, deep or flabby.	
SHOULDERS —Deep, medium width and fulness, well in line with back	6
<i>Objections:</i> Narrow on top or bottom, thick beyond the line with sides and hams.	
CHEST —Large, deep and roomy; full girth, extending down even with line of belly.....	12
<i>Objections:</i> Narrow at top or bottom, small girth, cramped or tucked up.	
BACK AND LOIN —Back straight or slightly arched; medium breadth, with nearly uniform thickness from shoulders to hams and full at loins; sometimes higher at hips than at shoulders.....	15
<i>Objections:</i> Narrow, creased or drooped behind shoulders; surface ridgy or uneven.	
SIDES AND RIBS —Sides full, smooth, firm, carrying size evenly from shoulder to hams; ribs, strong, well sprung at top and bottom.	8
<i>Objections:</i> Sides thin, flat, flabby or creased, or ribs not well sprung.	
BELLY AND FLANK —Straight and full, devoid of grossness; flank full and running nearly on line with sides.....	6
<i>Objections:</i> Belly sagging or flabby; flank thin or tucked up.	
HAMS AND RUMP —Hams of medium width, long and deep; rump slightly rounded from loin to root of tail; buttock full and neat and firm, devoid of flabbiness or excessive fat.....	10
<i>Objections:</i> Ham narrow; cut too high in crotch, buttock flabby; rump too flat, too narrow or too steep, or peaked at root of tail.	
LEGS AND FEET —Legs medium length, set well apart and squarely under body, wide above knee and hock and rounded and well muscled below, tapering; bone medium; pasterns short and nearly upright; toes short and firm, enabling the animal to carry its weight with ease.....	10
<i>Objections:</i> Legs too long, slim, crooked, coarse or short;	

weak muscles above hock and knee bone; large and coarse legs without taper; pasterns too long to correspond with length of leg, too crooked or too slender; feet long, slim and weak; toes spreading, too long, crooked or turned up.	
TAIL—Medium length, slightly curled.....	1
<i>Objections:</i> Coarse, long, clumsy, swinging like a pendulum.	
COAT—Fine, straight, smooth.....	2
<i>Objections:</i> Bristles or swirls, coarse or curly.	
COLOR—Black, with exception of white belt encircling the body, including fore-legs	2
<i>Objections:</i> White running high on hind-legs or extending more than one-fourth length of body, or solid black.	
SIZE—Large for condition; boar two years old and over, 450; sow, same age, 400; 18 months, boar, 350; sow, 325; 12 months, boar or sow, 300; six months, both sexes, 140 pounds.....	5
ACTION AND STYLE—Active, vigorous, quick and graceful; style attractive and spirited.....	4
<i>Objections:</i> Dull, sluggish and clumsy.	
CONDITION—Healthy, skin free from all defects; flesh evenly laid on and smooth and firm, not patchy, and devoid of all excess of grossness	4
<i>Objections:</i> Skin scurfy, scaly, mangy or otherwise unhealthy; hair harsh; dwarfed or cramped, not growthy.	
DISPOSITION—Docile, quiet and easily handled.....	3
<i>Objections:</i> Cross, restless, vicious or with no ambition.	
Perfection	100

LARGE YORKSHIRES.

The Yorkshire breed originated in England, which has three distinct types: the Large, Middle and Small White, and all bred in America, the Large Yorkshire being the most popular. It is with this bacon type that I shall deal. The old English hog was the foundation stock. Chinese hogs were imported and crossed on this breed and eventually developed a breed known as the Yorkshire, which was a large, white-colored hog of slow maturity, having great length of body and long legs, with a narrow, weak back. It grew to great size. Another type was produced from the same foundation through a sys-

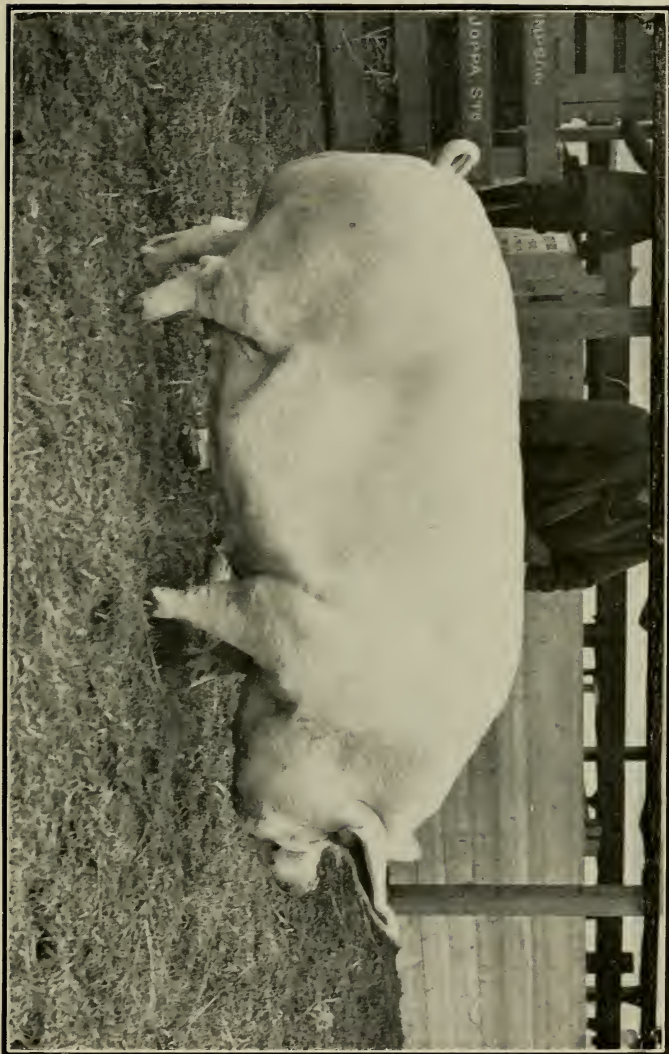


A PAIR OF LARGE YORKSHIRE SOWS.

tem of inbreeding which resulted in a type known as the White Leicester. It of course resembled the old Yorkshire in color and size, but inbreeding made it more compact and of finer quality. Another locality in England developed a smaller type from the same foundation blood. It was at this time that the historic English breeder Bakewell was improving several breeds of sheep by inbreeding distinct types. He also developed from white breeds of hogs a type much like the present Large Yorkshire.

Large Yorkshires were imported into Canada in the early '80's; the first importation into the United States was in 1892, followed by many later importations into different regions. The breed has gained rapidly in popularity and is noted for its prolificacy, grazing qualities and the production of superior bacon. It develops frame comparatively early and this offers opportunity for the production of cheap pork. The breed score card is affixed:

	Perfect Score
GENERAL OUTLINE—Long and deep in proportion to width, but not massive; slightly arched in the back, symmetrical and smooth, with body firmly supported by well-placed legs of medium length	5
OUTLINE OF HEAD—Moderate in length and size, with lower jaw well sprung, and considerable dish toward snout, increasing with advanced maturity	4
FOREHEAD AND POLL—Wide.....	1
EYE—Medium size, clear and bright.....	1
JOWL—Medium, not carried too far back toward neck, and not flabby	1
SNOUT—Turning upward with a short curve, increasing with age..	1
EAR—Medium in size, standing well out from the head, of medium erection and inclining slightly forward.....	1
NECK—Of medium length, fair width and depth, rising gradually from poll to withers; muscular, but not gross, evenly connecting head with body.....	3

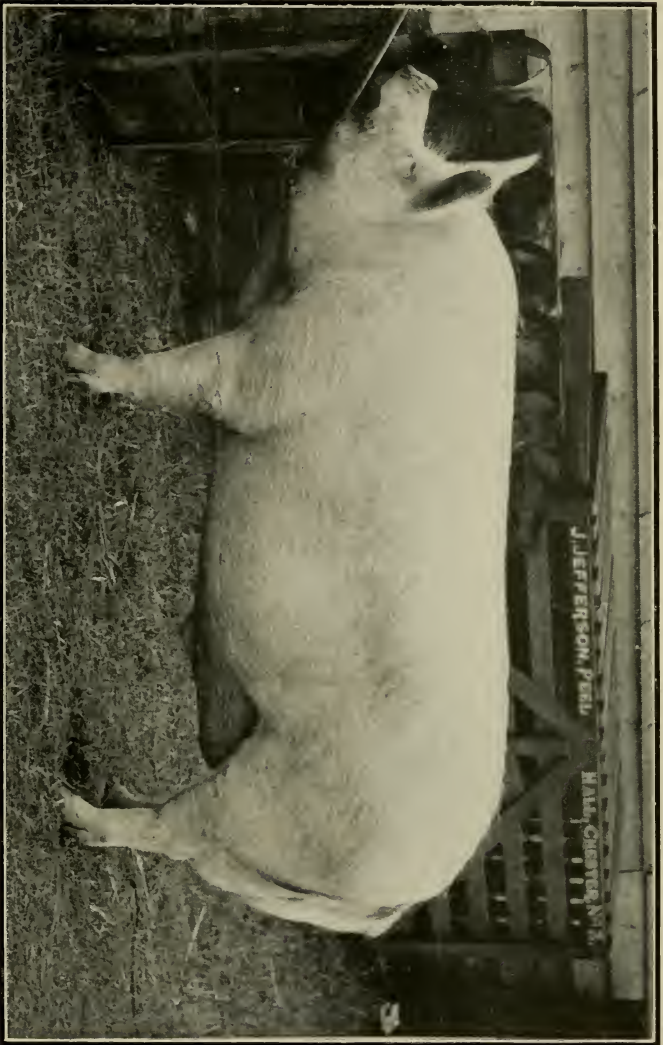


AN ENGLISH LARGE YORKSHIRE SOW.

OUTLINE OF BODY—Long, deep and of medium breadth, equally wide at shoulder, side and hams; top-line slightly arched, under-line straight	7
BACK—Moderately broad, even in width from end to end; strong in loin, short ribs of good length.....	10
SHOULDER—Large, but not massive, not open above.....	6
ARM AND THIGH—Broad and of medium length and development..	2
BRISKET—Wide and on a level with under-line.....	3
SIDE—Long, deep, straight and even from shoulder to hip.....	8
RIBS—Well arched and deep.....	5
HEART GIRTH AND FLANK GIRTH—Good and about equal.....	8
HIND-QUARTERS—Long, to correspond with shoulder and side; deep, with moderate and gradual droop to tail.....	5
HAM—Large, well let down on thigh and twist, and rear outline somewhat rounded	10
TWIST—Well down and meaty.....	1
TAIL—Medium, not much inclined to curl.....	1
LEGS—Medium in length, strong, not coarse, but standing straight and firm	5
HAIR—Abundant, long, of medium fineness, without any bristles...	4
SKIN—Smooth and white, without scales, but dark spots in skin do not disqualify	2
COLOR—White on every part.....	1
MOVEMENT—Active, but not restless.....	5
Perfection	100

TAMWORTHS.

Sir Robert Peel originated this bacon breed in Tamworth, England. He secured foundation stock from Ireland. This breed had existed in Ireland for many years. There is no evidence of its having been crossed with any other breed in Ireland or England. It is probably the purest-bred of all breeds of hogs, as the blood has been kept pure since the time of Sir Robert Peel. The Tamworth is an excellent bacon type on account of its conformation. It is described as a bright cherry red in color, though it is sometimes lighter or darker; nose rather long, with a clean-cut jaw; ears almost erect and straight; legs long but with good feet; shoulders narrow and



AN ENGLISH TYPE OF LARGE YORKSHIRE BOAR.

smooth with a long body and sides of considerable depth; a back flat on top with a good tenderloin. Tamworths were introduced into Canada about the same time that the Large Yorkshires were imported, and reached the United States from that country, some also coming from England. The score card is subjoined:

Color—Golden red hair on a flesh-colored skin, free from black.

Head—Fairly long, snout moderately long and quite straight, face slightly dished, wide between ears.

Ears—Rather large, with fine fringe, carried rigid and inclined slightly forward.

Neck—Fairly long and muscular, especially in boar.

Chest—Wide and deep.

Shoulders—Fine, slanting, and well set.

Legs—Strong and shapely, with plenty of bone and set well outside body.

Pasterns—Strong and sloping.

Feet—Strong and of fair size.

Back—Long and straight.

Loin—Strong and broad.

Tail—Set on high and well tasseled.

Sides—Long and deep.

Ribs—Well sprung and extending well up to flank.

Belly—Deep, with straight under-line.

Flank—Full and well let down.

Quarters—Long, wide, and straight from hip to tail.

Hams—Broad and full, well let down to hocks.

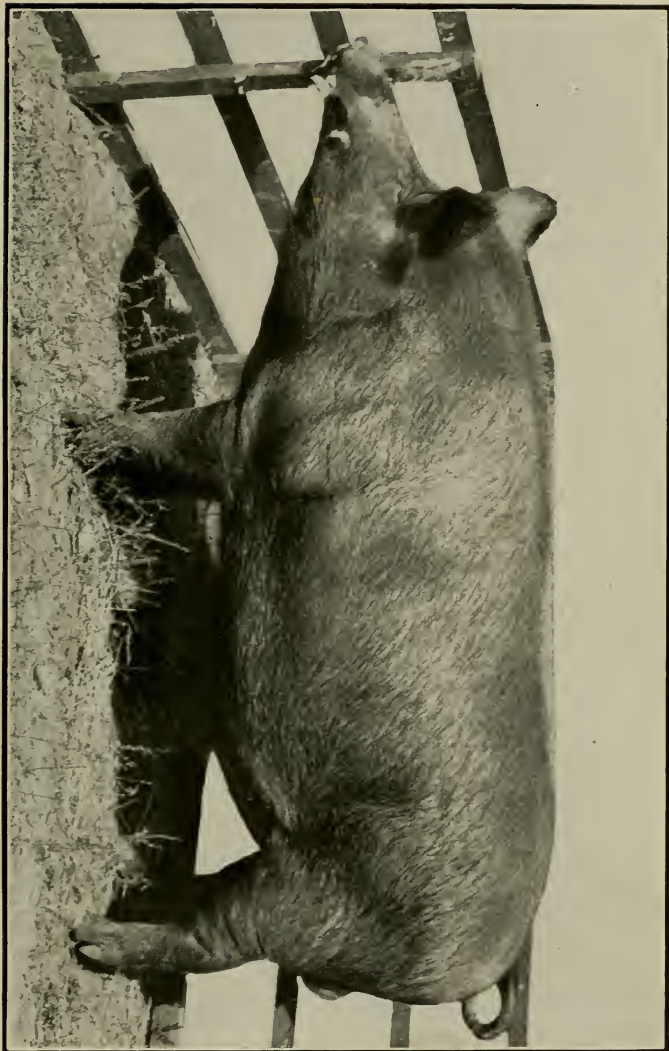
Coat—Abundant, long, straight, and fine.

Action—Firm and free.

Objections: Black hair, very light or ginger hair, curly coat, coarse mane, black spots on skin, slouch or drooping shoulders, wrinkled skin, inbent knees, hollowness at back of shoulders.

ESSEX.

This breed originated in Essex County, England, prior to 1800. Foundation blood was that of the old Essexshire type, which was large, rangy, mostly black in color, but generally having white fore-legs and shoulders. It is said that the Duke of Es-



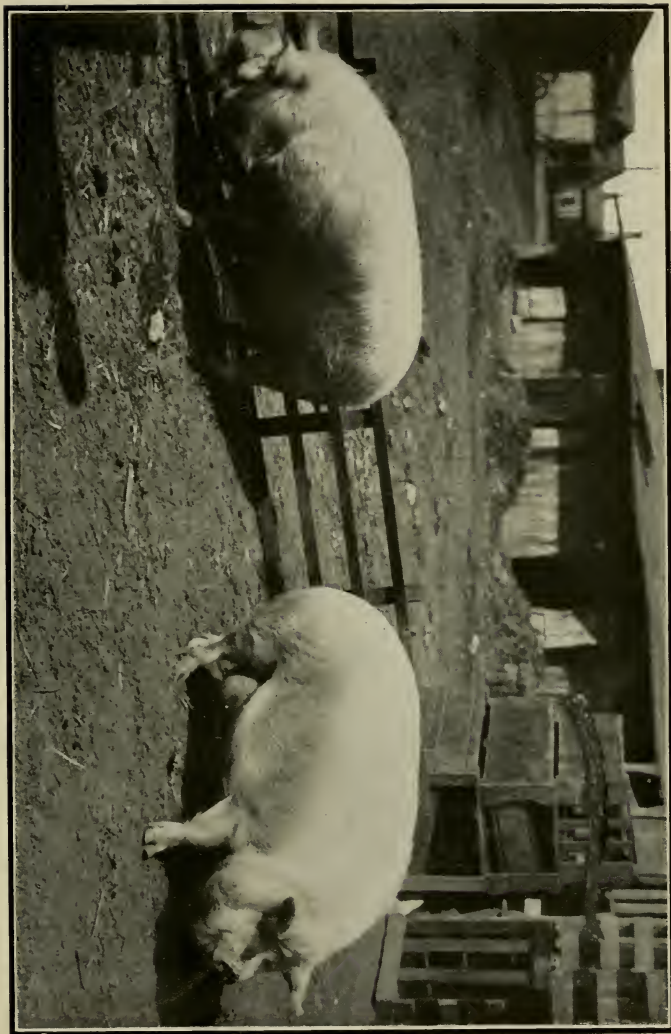
A TYPICAL TAMWORTH BOAR.

sex in 1820 imported Neapolitan hogs to cross on the old Essexshires, followed by using Berkshire and Sussex blood. By 1840 a distinct breed had been developed. It was solid black in color, for the most part, and highly prized for the production of pork of good quality. The first importation to this country was made in 1821 to Massachusetts, the hogs resembling the original Essex. Other importations followed, but no distinct type was established until after the importations during the '50's of improved Essex hogs from England. Essex hogs were used at an early date in the foundation of the Poland-China breed. They are prolific and as producers of meat and lard of good quality are held in high favor, especially in the South. Score card:

	Perfect Score
Color—Black	2
Head—Small, broad and face dished.....	3
Ears—Fine, erect, slightly drooping with age.....	2
Jowl—Full and neat.....	1
Neck—Short, full, well arched.....	3
Shoulders—Broad and deep.....	7
Girth around heart.....	6
Back—Straight, broad and level.....	12
Sides—Deep and full.....	6
Ribs—Well sprung.....	7
Loin—Broad and strong.....	12
Flank—Well let down.....	2
Ham—Broad, full and deep.....	12
Tail—Medium, fine and curled.....	2
Legs—Fine, straight and tapering.....	3
Feet—Small	3
Hair—Fine and silky, free from bristles.....	3
Action—Easy and graceful.....	4
Symmetry—Adaptation of the several parts to each other.....	10
Perfection	100

VICTORIAS.

The origin of this breed is credited to New York breeders. In type it is similar to the modern Suffolk. G. F. Davis of Indiana established a type by



VICTORIA SOWS.

using Poland-China, Chester White, Berkshire and Suffolk blood. He claims that the Victorias are prolific, easy to mature and fatten, and to keep in good condition. The eastern type is smaller and more compact. Score card:

	Perfect Score
Color—White, with occasional dark spots in the skin.....	2
Head—Small, broad, and face medium dished.....	3
Ears—Fine, pointing forward.....	2
Jowl—Medium size and neat.....	1
Neck—Short, full and well arched.....	3
Shoulders—Broad and deep.....	7
Girth around heart.....	6
Back—Straight, broad and level.....	12
Sides—Deep and full.....	6
Ribs—Well sprung	7
Loin—Broad and strong.....	12
Flank—Well let down.....	2
Ham—Broad, full and deep, without loose fat.....	12
Tail—Medium, fine and curled.....	2
Legs—Fine and straight.....	3
Feet—Small.....	3
Hair—Fine and silky, free from bristles.....	3
Action—Easy and graceful.....	4
Symmetry—Adaptation of the several parts to each other.....	10
Perfection	100

COLOR—White, with occasional dark spots in the skin.

HEAD AND FACE—Head rather small and neat. Face medium-dished and smooth; wide between eyes; tapering from eyes to nose.

EYES—Medium size; prominent, bright, clear and lively in young, and quiet expression in aged animals.

EARS—Small, thin, fine, silky; upright in young pigs, pointing forward and slightly outward in aged animals.

NECK—Medium wide, deep, short, well arched, and full at top.

JOWL—Medium full, nicely rounded, neat and free from loose, flabby fat.

SHOULDERS—Broad, deep and full, not higher than line of back, and as wide as top of back.

CHEST—Large, wide, deep and roomy, with large girth back of shoulders.

BACK AND LOIN—Broad, straight, or slightly arched; carrying same width from shoulders to ham; level and full at loin, sometimes slightly higher at hips than at shoulders.

RIBS AND SIDES—Ribs well sprung at top; strong and firm; sides deep, full, smooth and firm; free from creases.

BELLY AND FLANK—Wide, straight and full; as low or slightly lower at flank than at chest. Flank full and nearly even with sides.

HAMS AND RUMP—Hams long, full and wide, nicely rounded; trim and free from loose fat. Buttocks large and full, reaching well down to hocks. Rump slightly sloped from end of loin to root of tail.

LEGS AND FEET—Legs short, set well apart and firm; wide above knee and hock, tapering below. Feet firm and standing well up on toes.

TAIL—Small, fine and tapering, nicely curled.

COAT—Fine and silky, evenly covering the body.

SIZE—Boar two years old and over when in good condition should weigh not less than 500 pounds; sow same age and condition, 450 pounds. Boar 12 months old, not less than 300 pounds; sow in good flesh, 300 pounds. Pigs five to six months old, 140 to 160 pounds.

ACTION—Easy and graceful, but quiet.

CONDITION—Healthy; skin clean, and white or pink in color, free from scurf; flesh firm and evenly laid on.

DISPOSITION—Quiet and gentle.

DISQUALIFICATIONS: Color—Other than white or creamy white, with occasional dark spots in skin. Form—Crooked jaws or deformed face; crooked or deformed legs; large, coarse, drooping ears. Condition—Excessive fatness; barrenness; deformity in any part of the body. Pedigree—Not eligible for record.

CHESHIRE.

Several breeders in Jefferson Co., N. Y., including A. C. Clark, who imported Cheshire sows from England, which he bred to boars, were responsible for the development of the Cheshire breed. They used the blood of Yorkshire, Suffolk and Cavanaugh hogs. Inbreeding was practiced to produce individuals of high merit. This breed was first called the Jefferson County hog. During the '60's and '70's, and after the retirement of Mr. Clark during the later '60's, several other breeders carried on the work of establishing a distinct breed. The type was changed somewhat and in 1884 the leading breeders effected an organization with a standard of excellence. Cheshires have never reached any degree of popularity outside of New York. They are early-maturers and prolific, good mothers.

Following is the score card:

	Perfect Score
HEAD—Short to medium in length, short in proportion to length of body	8
FACE—Somewhat dished and wide between the eyes.....	8
JOWL—Medium in fullness.....	3
EARS—Small, fine, erect, and in old animals slightly pointing forward	5
NECK—Short and broad.....	3
SHOULDERS—Broad, full and deep.....	6
GIRTH AROUND HEART.....	8
BACK—Long, broad and straight nearly to root of tail.....	10
SIDES—Deep and full; nearly straight on bottom line.....	7
FLANK—Well back and low down, making flank girth nearly equal to heart girth.....	3
HAMS—Broad and nearly straight with back, and running well down toward hock.....	10
LEGS—Small and slim, set well apart, supporting body well on toes.	10
TAIL—Small, slim and tapering.....	3
HAIR—Fine, medium in thickness and quantity.....	3
COLOR—White; any colored hairs to disqualify.....	2
SKIN—Fine and pliable; small blue spots objectionable but allowable	3
SYMMETRY—Animal well proportioned, handsome, and stylish; and when grown and well fattened should dress 400 to 600 pounds.	8
Perfection	100

THE SCORE CARD.

Soon after the American Poland-China Record was formed in Iowa during the early '70's, it was recognized by several Poland-China adherents that there was a need of some sort of established standard of excellence to guide judges and breeders. To Father Hankinson, as he was familiarly called, perhaps the first score card can be credited. After much discussion a standard was adopted during the early '80's. The ideal described by it was so high that it was considered a standard for all time, but the early '90's found some of its requirements outgrown or

impracticable, being out of line with the type demanded by the markets. So a committee was appointed in 1896 to revise the standard and make it strong on points of commercial importance. This committee consisted of J. V. Wolfe of Nebraska, W. W. McClung of Iowa and myself. After much deliberation we constructed a new standard which was adopted in June, 1906. It gave satisfaction until it began to be misinterpreted and carried to extremes. As to a score card, nobody will question its usefulness in measuring values. Breeders need the aid of its direction. Its study makes for a united effort in a common direction. It establishes a goal at which to aim. Its main weaknesses are due to misinterpretations by breeders in developing certain points to an extreme. This in some cases has prompted other breeders to disregard these points and go in for others, resulting in warring extremes that in breeding work against real progress. In spite of such abuses the score card has worked improvement in the breed, and there is no question that in large measure we can credit the present popularity of Poland-Chinas to the standard by which the rank and file of breeders have been influenced. All the common breeds are approaching their respective ideals, and the time soon will be opportune to set our stakes far ahead in new fields.

PEDIGREE STOCK.

The pedigree is a certificate of pureness of breeding in which the line of descent is tabulated, and

the individuals composing it represented by names and figures. When properly certified by a record association a pedigree becomes a guarantee of lineage and heredity. From it an intelligent breeder can form conclusions regarding the effects of further breeding with the pedigree animal. It will thus be seen that the pedigree is an important safeguard against cross-breeding and inadvisable matings. The value of pedigree stock is now recognized on every hand. Pure bred pigs fatten evenly where the scrub fattens in bunches around the internal organs; they fill out in proper proportions of lean and fat where the scrub is unevenly developed; they fatten at less expense and often bring \$1 to \$2 per cwt. more, owing to the better quality of their products.

HOG-FARM EQUIPMENT.

Hogs reach their highest state where there is good water and the greatest variety of feed. They graze, eat grain and will consume flesh. It is the nature of a hog to eat a little at a time and often. So a location for hograising should be where staple crops for feeding grow in abundance. A considerable portion of the land should produce corn, wheat, oats, barley, rye, alfalfa, clover, peas, beans and roots. As to topography, one need not be fastidious except in relation to crop-growing. Hogyards, however, should have good natural drainage so that rains will wash away much of the accumulation of manure and waste and not collect in mudholes. In this way nature helps to make sanitary conditions. Shade and protection from cold, wind and storm are essential. Groves of native or planted timber afford excellent places of retreat. Part of the farm should be in pasture, and as rough or rolling land is peculiarly adapted for pasture, a farm that has both rough and smooth land is admirably suited for stockraising. Many breeders find that dairying in connection with pork production increases the resultant profits, each line being an aid to the other. A few milch cows should therefore be kept on the premises as an adjunct to the hog department. Locate the hog plant on the sunny side, with hills and windbreaks

on the north and west, and a sufficient slope to insure drainage.

As to water, the best sources of supply are springs, wells, and streams originating on the farm. Make fresh water accessible at all times to the herd.

A hog-farm should be of sufficient acreage to produce feed and give ample range for a strong herd managed on the intensive basis. The common mistake is to try to cover too large an area. Large farms take almost the entire time and attention of occupying owners, so that the hogs must shift largely for themselves. A hog-farm should have several sources of revenue besides its hogs. Generally speaking, an 80-acre farm is almost ideal, so far as size is concerned, for hograising. All branches of agriculture are being conducted on scientific lines, as the problem of cheaper production makes this imperative. The day of producing great quantities of inferior products is past. The present and future demand quality. As agricultural land is limited increased production depends on brains. Our small farms must be raised to the highest productivity.

SWINE BARNs AND HOUSES.*

What would be the business future of the swine breeder whose hogs were compelled to be exposed to the cold blasts of winter or the glaring sun of summer? What would their condition be if they

*This discussion in outline of the general principles that should be carefully considered by every hog-raiser who plans to equip his farm for the special business of raising hogs is taken from "Farm Buildings," a new and valuable illustrated work published by THE BREEDER'S GAZETTE.

were obliged to eat and sleep in filth? What would the pig crop be if the sows were allowed to farrow in the fence corner some cold stormy night with only the canopy of heaven to shelter them? Answers to these questions will urge the proper equipment of the farm for the breeding of pure-bred swine. How extensive the equipment should be will depend, of course, on the number of animals to be carried on the farm and the amount of money to be invested.

First a swine breeder should have necessary buildings for housing the herd, the feed, the apparatus for mixing and preparing the feed and the procuring of the necessary water. There are many kinds of buildings for this purpose, many of which are satisfactory. Breeders have different ideas regarding this matter, many preferring the large gloomy hoghouse or building where the whole herd may be kept under one roof, and where the bedding, feed, water and everything pertaining to the comfort of the animals may be kept convenient and used with the least labor, and where all the work in caring for the herd may be done under cover. This plan has many advantages and where adopted the buildings should be so arranged that as much sunlight as possible may be admitted to the pens and feeding floors. There are other breeders who prefer the outdoor individual house large enough for only one sow and her litter, with a grass lot of at least one-half acre where the sow and pigs may always be by themselves. This latter plan will, of course, occupy considerable land, at least where the herd is large, and

will necessitate considerable fencing into lots along either side of a lane and the hauling of all the feed to the different lots at each feeding time. But this plan insures both abundant pasture for the sow and litter as well as plenty of room for the necessary exercise, and has the advantage of always affording clean quarters for the hogs and freedom from disturbance for sows farrowing.

There are many different plans for both the large houses and small individual houses, from which may be selected whatever best pleases the breeder. As much or as little expense may be put into the building of hoghouses as the breeder desires.

All buildings used for breeding and feeding swine should be strongly built and made of good material, and all should have floors both for feeding and sleeping apartments. Floors made of wood are preferable in the sleeping quarters, being warmer and more easily kept dry. Where the large hoghouse is used many prefer the feeding floor to be constructed of concrete or cement and the sleeping floor of wood. Where the building is used for the feeding of a large number of swine together some prefer the feeding floor to be constructed along the outside of the building, and in such instances the floor should be constructed of concrete or cement, raised slightly above the surrounding surface. A cement feeding floor of this kind properly made would be practically indestructible and would be easily kept clean either by sweeping or flushing with water.

Where the individual system of houses is used there is no necessity for a feeding floor except a small one about 8'x8' in one corner of the lot most convenient to feed, and this only for the use of the litter where the pigs may be fed secure from the intrusion of the mother. She may be fed near them from a single trough.

Where the individual houses are used it will be necessary to have a feedhouse or building so arranged that all feed may be kept there in separate bins; where water may be easily obtained either from an elevated tank or from a pump in the building and where the mixing of the feed may be done. With this system the easiest way to distribute the feed to the various lots is to use a wagon not to exceed 12" in height from the ground, and large enough to hold three or four barrels of feed set upon it. Such a wagon with a pair of shafts and a gentle horse kept for the purpose of hauling all feed and water to the different lots makes it very easy for the feeder to care for 100 or 200 hogs in a short time with very little labor.

Where the feeding is all done in one building or house a feed-carrier suspended from a steel track above the alley is the most convenient way to handle the feed, as it requires but very little effort to carry a large amount of feed in this manner along the alley.

There are many kinds of troughs on the market. Some of them are good, others better and some absolutely worthless. Old-fashioned wooden troughs

are about past. They are expensive because so soon destroyed, and are always damp and convenient for animals to put their feet in while eating. There are several types of galvanized iron troughs as well as two or three cast iron troughs. One of the latter is made for animals of any size and is absolutely unbreakable. This trough weighs 122 pounds, is round and accommodates eight animals, and whether small or large animals they are never crowded, as the trough forms a circle. A hog or a pig can not get its feet into it, for the reason that it eats out of a cup just large enough to stick its nose in. These cups are filled from the center in a receptacle where the feed falls on a cone, thus being evenly distributed into the eight individual cups, which are separated by a heavy iron rod, and the pigs can eat only from the cup before them. These troughs are always clean, having no place for the feed to lodge and become foul. This style of trough possibly is not suited to pens along a feeding alley in a building, but for outdoor use it is admirable for feeding slop. The matter of feed troughs is of great importance, as all feed in the condition of a slop or mush should be fed in good troughs easily kept clean. No feed should ever be fed on the ground, unless it may be ear corn where the ground is frozen or is hard and smooth.

A breeding crate should always be used. This is an important matter. By this method of breeding the number on the ear tag or the ear mark may be taken and entered in a book at the time of breed-

ing, giving day and date. There are several kinds of breeding crates and the breeder can easily learn which is best for his purpose.

Another necessary fixture on the swine breeding farm is a good dipping tank. This is of great value not only for the purpose of disinfecting swine, destroying vermin and mange, but in keeping the skin and hair in a healthy condition. Such a tank sunk into the ground with a chute from an incline where the animals slide down into it and have to swim through the dip will pay on any pure-bred swine-farm. It is of great value in preventing disease.

Another valuable appurtenance is a first-class feed steamer. It is generally admitted that while cooked or steamed feed is of no advantage so far as economy or nutriment is concerned, it is of great value in the feeding of young pigs during the cold months, as young pigs fed on warm feed either cooked or scalded with hot water thrive almost as well during cold months as through the warm weather. It is also of value in feeding brood sows during the winter season, as a mixture of clover hay, or where possible alfalfa, run through a feed cutter and mixed with meal, bran or middlings and steamed or mixed with hot water is an ideal feed for brood sows.

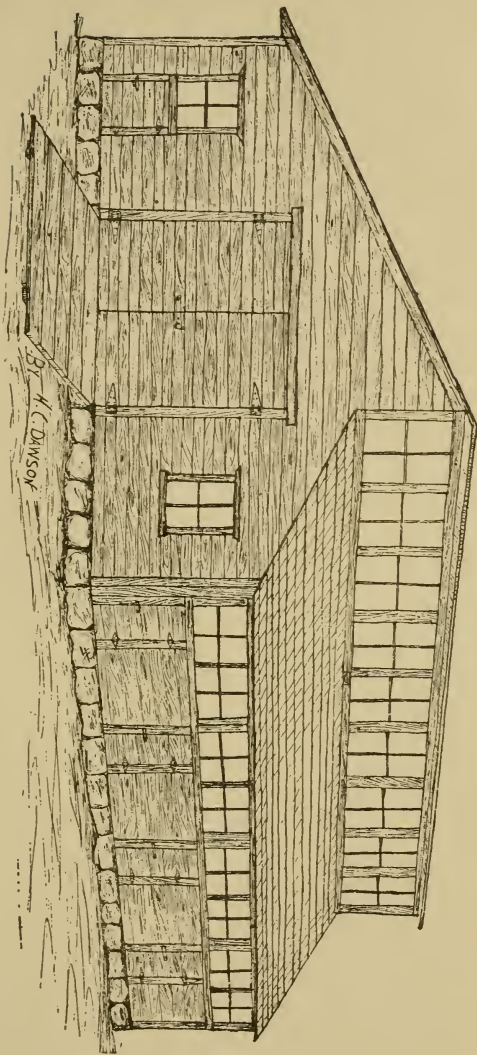
LARGE HOGHOUSES.

Large hoghouses are constructed for the purpose of housing many hogs and are adapted to a combination of uses, including breeding and sleeping

quarters for sows and litters, and for fattening hogs when not in use for farrowing purposes. In building them the main essentials sought are cleanliness, dryness, warmth, sunlight, ventilation and labor-saving arrangements. There are many styles of hoghouses, and to recommend any one particular popular design is no part of my duty as an author. As we become familiar with the various types we know which one is best suited to our purpose. In form hoghouses are either square, oblong, octagonal or round. As a rule where one form possesses strong features it is weak in some other point. As to the outlay for a hoghouse, be governed by a close study of the conditions at hand. The condition in which a house is kept has a closer relationship than the cost to the results secured. Perhaps one of the most commonly-used hoghouses—and it gives widespread satisfaction—is described as follows: Dimensions, 24'x48'; it is divided inside by six pens on the south side, each pen being 8'x8'; the north side, which is 8'x48', is fixed with movable partitions every 8', giving use of this entire space for sundry purposes. This leaves an alleyway of about 8' in width through the center of the house. If it be desirable, a bin can be constructed at either end of the north side or in the back end, and a platform erected wherever most convenient on which to set a stove.

The height of the pens is generally 3' to 4'; each pen should have a good strong door opening into the alley, and provided with a secure lock or fastening. Each pen facing the south should have a small door,

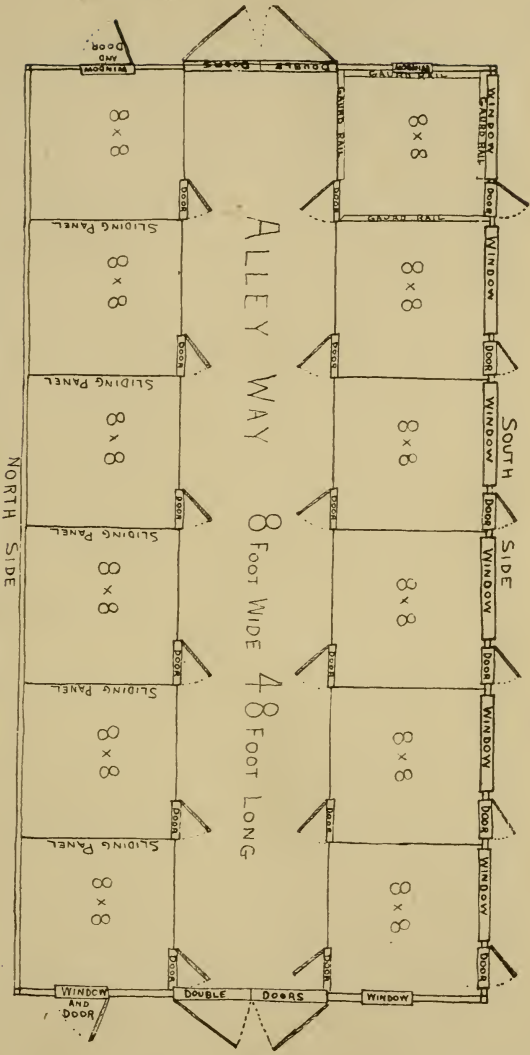
A MODERATE-PRICED CENTRALIZED HOGHOUSE.



also with a strong latch, opening outward. It is not advisable to have doors or openings on the north side, but small doors are needed at each end of the north row of pens, opening outward to the east and west. The floor plan gives the use of 11 or 12 pens when necessary, and of six farrowing pens, with one or two large sleeping or feeding places for large droves of hogs. The north side can be fitted with troughs along the alley partition, which will be found very convenient for use in feeding fall pigs or other hogs when weather conditions are bad.

The foundation should be constructed to stand wear and tear, be easily cleaned and free from dampness and habitation by rats. It should be at least a foot higher than the ground level, surrounded on the east, south and west sides with a gently-sloping floor extending 8' or 10' from the house. Concrete is the best material for floor and foundation construction, but where this is not practicable planks may be used, if laid close and tight, with proper slope for drainage.

It is advantageous to erect inclosures around the outside floors, with movable partitions, so that each inside pen, if desired, may have a separate outside inclosure, especially on the south side, while the north side and south as well can, by lanes and partition fences, be arranged so that they may connect with large yards and pastures. In using concrete for floors it can be roughed on the surface and small creases be arranged in the pens with slopes of a few inches to drain out collections of moisture.



GROUND PLAN FOR CENTRALIZED HOGHOUSE.

The slope can be made either to the doors of the outside or to the alley. The back part of each pen or the largest space away from the doors should be higher than at the doors. This space is used as the sleeping part of the pen. It should be well drained. Should the cement prove too damp and cold, a wooden platform can be constructed to fit each pen. These can be removed, cleaned, aired and dried, when necessary. The pen floors should be several inches higher than the alleyway or the outside floor. Should neither concrete nor plank be desired for flooring, a good serviceable floor can be constructed of sand, gravel, clay or cinders by mixing and tamping the material down very compactly, then placing a close-meshed heavy wire fencing flat on the surface, stapling the ends and sides to the sills of the foundation and covering this with two or three inches of sand, dirt or gravel. This will work down, and with a little more material and attention form into a fairly even, hard floor. However, such a floor is sometimes hard to clean and keep sanitary, but it proves to be better than plank or cement floors in many instances, as cement floors are generally cold and damp, and plank floors rot or hold dampness. Well-constructed plank floors give better satisfaction.

Around the sides of each farrowing pen 1"x6" or 2"x6" pieces are nailed horizontally 6" or 8" from the floor, forming a shelf to protect the pigs during their first few weeks in the hoghouse. Underneath these projecting pieces the youngsters are safe from trampling by their mother. To admit light and sun-

shine windows are placed in the south, west and east sides, one window for each pen, while some houses have a solid row all along the south side at the top and bottom. To secure an even distribution of sunlight the house is built with an offset of the roof on the south side. It is 3' in depth—sufficient to take a row of windows directly underneath the top comb-boards. This plan makes the south roof several feet lower than the north one. This row of windows furnishes sunlight for the north pens; the south pens secure theirs through windows placed in line under the roof and over the doors of the south side. In some cases windows also are placed in the east and west end, where they will admit sunlight to inside pens. A chimney of brick should be built from the loft up through the center of the house. Over the pens of the north side a loft can be arranged to store bedding or other articles likely to be needed, and if desired a small room can be fitted up at one end or the other for the storage of feeds and utensils.

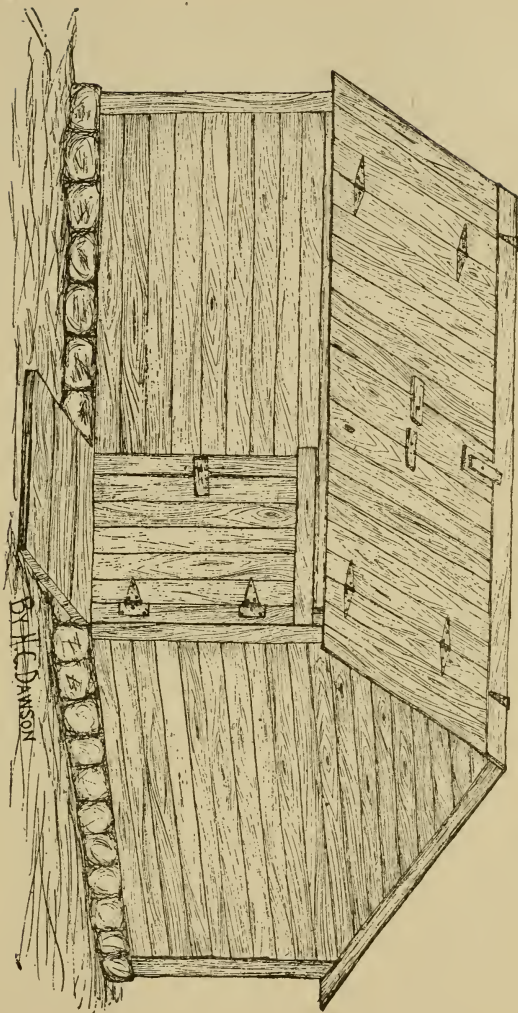
In construction the hoghouse proper should be framed and put together solidly, and be made almost air-tight, so that ventilation can be regulated by the doors and windows. The roof can be of shingles or rubber roofing; iron roofing is cold in winter, hot in summer. The siding may be constructed much like that of a farm residence, using building paper between the sheeting and the siding, or iron siding over the sheeting and building paper, or shiplap or rubber roofing over the siding. It is essential that the hoghouse be centrally located, close to the var-

ious yards and pastures, and used for hogs only. I would install a water supply system in it. Some hogmen arrange this with a well or a cistern close by or in the house; others place a dipping tank underneath the floor in the alleyway.

Such a house as I have described answers every practical purpose, and in price it is not out of reach by most breeders. It can be built as one's means permit by building it in sections or a little at a time. A few hundred dollars will erect the frame and \$400 or \$500 will cover the entire cost of the material.

INDIVIDUAL HOGHOUSES.

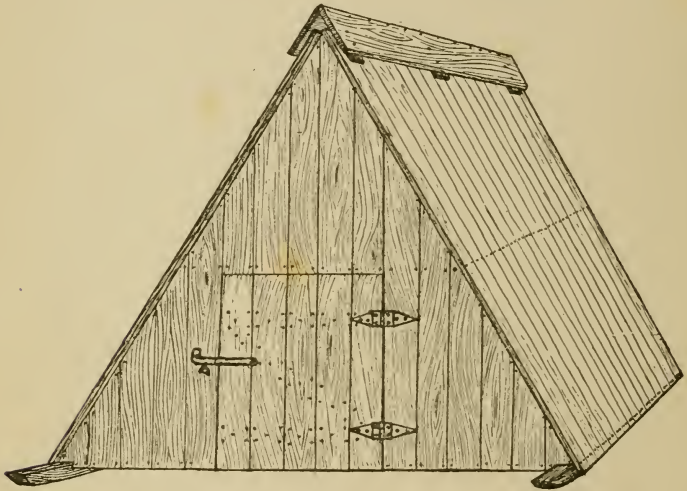
The use of small, movable hoghouses, designed for the individual occupancy of one sow and litter, constitutes the so-called "colony system." Many breeders combine it with the centralized plan, which is perhaps the most satisfactory in the central hog-belt. The centralized system is preferable in the North and the colony system is best for the South. A strong recommendation for the individual house is that it is isolated, and thus offers many advantages in coping with contagious diseases. Affected or exposed hogs can be quarantined by moving the houses and affected animals to a remote part of the farm. As the cost of the individual house is small it can be destroyed and replaced with a new one without serious sacrifice, while should disease break out in a costly centralized house this expedient would be out of the question. Good serviceable houses of this type can be built at a cost of from



NEBRASKA TYPE OF INDIVIDUAL HOGHOUSE.

\$10 to \$25, according to location, prices of material and of the size and design desired, while it will take from \$20 to \$35 to house a sow and a litter in a larger centralized house.

There are several designs, of which the wigwam or tepee and the small oblong or square are the most popular. The floor dimensions are from 6' to 7'



WIGWAM TYPE OF HOGHOUSE.

wide, 8' to 10' long and 6' to 8' high. The base is generally constructed to rest on skids, so that the house can be moved easily about by horses or men. The roof also serves as the sides, as it extends from the floor sill to the ridge piece. To secure sunlight a small window or door is placed over the lower door in the top of the front end. The door is 2' to 3' wide and about 3' high. It should be hinged and carry a



BERKSHIRE SOWS AND A WIGWAM HOGHOUSE.

secure fastening. To secure ventilation the comb boards can be raised higher than the roof board by means of small blocks and by leaving a space between the roof boards. The sloping sides prevent the sow from lying close enough to the edges of the floor to endanger the young pigs; indeed this construction provides a protection for them, and for the same purpose a guard rail is nailed across the back end. These houses can be constructed without board floors or with cement floors, but a doubled board floor is more satisfactory. They are generally roofed and sided with shiplap lumber and, to secure more warmth, can be covered with rubber roofing. It is an advantage to have a window in the end opposite but higher than the door in the other end. This provides far better ventilation, and enables the owner or herdsman to reach in with a whip and drive the occupants out at the other end.

The oblong or square design is generally 6'x8' or 8'x8' in dimensions, with the bulk of the roof sloping to the north; a window or a door is built in the top part of the south side for sunlight and ventilation. Another design has about two-thirds of the roof sloping to the north and one-third to the south, with a door or a window in this part. The oblong and square styles are generally made permanent in location, although some men provide them with skids to facilitate moving. I think it best occasionally to move all small hoghouses. All such houses should be located on high points in the hogyards. Drainage is thus provided for, and sanitary condi-

tions are more easily maintained. Many breeders make the mistake of housing and confining hogs in low places where the ground is cold and wet, and surface drainage impossible.

FEEDING FLOORS.

The value of a solid, clean surface on which to feed hogs cannot be overestimated. It can easily be swept, washed and cleaned. A cement floor properly constructed will last a lifetime and it can be disinfected and kept in a sanitary condition. How to mix and use cement, gravel and sand for floors, walks and foundations is explained in literature which the leading cement manufacturers will supply on application.

A feeding floor should be several inches above the level. To secure a permanent floor dig an excavation from 8" to 12" deep. To construct the bottom part, fill with 4" or 5" of rock broken into pieces small enough to lie close together and form a fairly level surface. Then a mixture of coarse gravel or crushed rock and Portland cement, four parts of the former and one part of the latter, may be tamped into the spaces, forming a solid foundation. This can also be made to overlie the rocks 2" to 4". The next layer or course is made of a mortar or finer sand or gravel mixed at a ratio of four to one or three to one, properly tamped and trowled, until it is 5" or 6" in thickness, being a trifle higher in the center with a slope to all sides. A top coat made of fine sand and Portland cement mixed in the proportion of three to

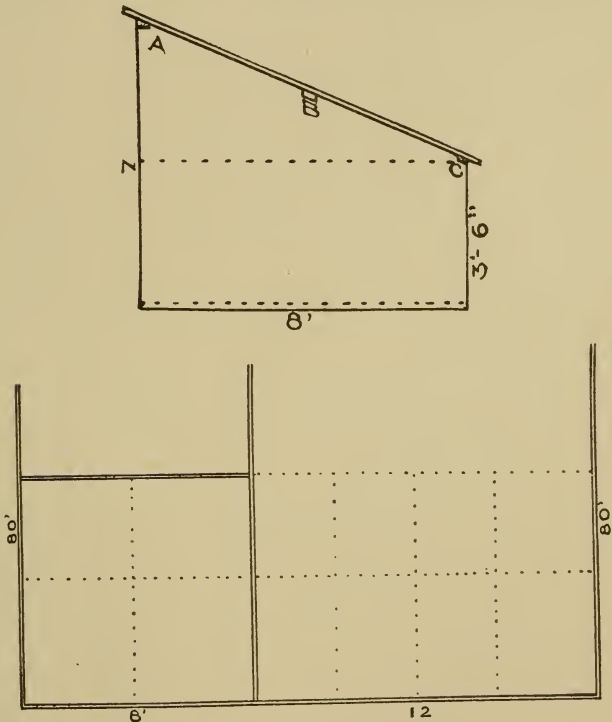
one is applied to a depth of 2" or 3". This coat must be thoroughly trowled until the cement works out well on top, and a little dry cement may be scattered over it and worked in by trowling. The final touch consists in roughening the surface and by dividing the floor into squares by open lines, as in sidewalk construction, to prevent checking and cracking by frost. It is best to construct feeding floors inside of wooden frames, leaving them in place for at least two weeks, so that the cement may become perfectly hardened. As most feeders use such floors for both wet and dry feeds it is advisable to mortise in bolts with round eyes, placed so that they will project 4" to 5" above the surface of the floor, where it would be convenient to put troughs. To these bolts the troughs can be secured to the floor, from which they can be easily removed. A floor of this kind on the sunny side of a building, hoghouse or shed, is one of the best investments a breeder can make.

Plank floors are expensive, unsanitary and do not last long. Besides, they are hard to keep from sagging. Where flat stones or vitrified bricks can be obtained at small cost good floors can be made by laying them close together, filling the interstices with concrete or cement and binding the edges with a cement wall or planks. Floors may also be constructed of small rocks with a heavy dressing of coarse gravel and clay tamped between them and closed with a plank binding at the edges. Some hogmen select high elevations and improve the surface by coarse gravel and clay.

The essential of feeding floors is a hard, permanent surface, impervious to weather, proof against rooting by hogs and easily cleaned and disinfected.

HOGHOUSE AND FEEDING FLOOR.

A plan for a hoghouse for 100 hogs and a feeding floor for hogs is shown in the accompanying diagrams to which the subjoined description applies:



Concrete makes the best and cheapest feeding floor. It is rather cold for a sleeping room, and is

not so dry as a board floor. Dryness and warmth are necessary for young pigs.

Ten pens 8'x8' will accommodate 100 fattening hogs. In front of these pens make a concrete floor 12'x80'. For foundation and nail ties of the house set on edge five 2"x6"x16' joists on the north side, one 2"x6"x8' on east, one 2"x6"x8' on west and five 2"x6"x16' on south side and spike together at corners. Make the foundation 8' wide, outside measurement. Cut eight 2"x4"s 7' 8" long and place with tops flush with the outer joists for partition ties and spike to keep in place. Then drive enough strong stakes to keep all in line. Fill in with 3" of concrete made of 6 parts of crushed stone or gravel or screened cinders to 1 part of good Portland cement. Tamp evenly until the water begins to show on the surface. After this sets finish with a coat of cement, 1 of cement to 3 of coarse clean sand. Use a straight edge 9' or 10' long to finish up level with the 2"x6" and 2"x4" ties. Trowel down to a good finish and be careful that there are no depressions to invite water and ice.

This done, lay off the feeding floor 12'x80' by setting on edge a 2"x8"x12' joist at each end and five 2"x8"x16' parallel with front of house 12' away. Secure the corners and joints and stake well and fill in with concrete as in the foundation for the pens. Finish flush with the tops of the outside joists. A better job will be had if a concrete curb is made instead of using the wood outside curb, but it will cost more. As the concrete is finished it must be cut

through in squares not over 5', better 4' or 3' to insure against cracks that are sure to follow expansion and contraction with changing temperatures. After the cement has well set fill all the cuts made with hot pitch or coal tar roof paint; this keeps out water, yields to expansion and adds to the life of the floor. This should be hot and poured in from a vessel with a lip or spout to secure a small stream.

The erection of the pens on the foundation is easy. We need 20 2"x4"x16' and 11 2"x4"x8' for nail ties and roof support, and 1,800 feet of 16' lumber, free from knot holes. To this add shingles or metal for roof. Make the rear of the house 3' 6" and front 6'. The top rear nail tie acts as nail tie and roof support. The front has two nail ties, one 3' 6" above floor and the other 6' above the floor; this also is a roof support or plate. Another 2"x4" must be the center support of the roof. The sheeting must run up and down and is ready for shingle or metal, but it will pay to cover with tarred paper before laying shingles or metal, as it will be warmer and keep out snow. It will pay to make the siding double and use tarred paper between, as this actually keeps out snow and wind, which are disastrous at farrowing time. The doors in front should be 2'x3' and hung on hook hinges. A drop window 18"x5' 6" will give air and sunlight, opening south. After cutting the cement floor into blocks pass a tool along the cut and round the edges. Round the edges of the floor, too, as this will prevent crumbling that is sure to follow with edges sharp and rough. According to the

testimony of those who have used this hoghouse and feeding floor, results have been uniformly satisfactory from every point of view. They consider the combination decidedly convenient and economical.

CONCRETE FLOOR FOR HOGHOUSE.

The bottom to receive concrete should be solid, so that it will not settle in holes nor out of the original level. It must be so that no water can stand under it, as it will freeze in winter and heave up the floor, of course cracking the concrete. It is best to remove a few inches of top soil and tamp well the surface that is to receive the cement. The general way is to excavate 8" to 12" and fill with gravel. But if the floor is protected from water getting under it the gravel is not necessary.

The best concrete is made from broken stone, gravel and coarse sand. Mix dry 13 parts gravel, 6 parts sand, 6 parts Portland cement, then when thoroughly mixed, add water to make a stiff paste. Then take 27 parts broken stone, thoroughly drenched with water, so that all fine dust may be washed out, and mix the crushed stone with the other until all is incorporated with the cement.

In laying cement it is best to divide the floor into squares of 4' or 5' with 2"x4" pieces firmly staked down. Fill every alternate square with the mortar well tamped down until the fine cement begins to come to the top. After it has stood a short time at least, but before it is dry, apply a finishing coat of $\frac{1}{2}$ " or $\frac{3}{4}$ " made of 2 parts sifted sand to 1 part of

cement, smoothing down with a trowel. After setting it so as to be fairly firm remove the 2"x4s" and fill the other squares in the same way. If made in too large squares shrinkage cracks will occur. In laying cement walks or feeding floors outdoors the cracks marking the divisions or squares are cut clear through the cement, thus allowing for contraction and expansion.

To make concrete without the broken stone coarse gravel may be used, but it will need more cement, say 6 or 7 parts of sand and gravel to 1 of cement. There seems to be no hard and fast rule as to this. Only as much should be mixed at one time as can be immediately used.

After completion the floor should be sprinkled daily with water, which is necessary to complete hardening of the concrete. It is best to leave the studding around the outside for a long while. Concrete will usually cost from a quarter to a half more than wood, but the concrete is for all time and is certainly more sanitary and easier to clean and keep clean.

BEDDING.

Clean bedding for hogs promotes and conserves health. Quality rather than quantity must be considered in selecting bedding. It is far better to have a dry floor, bare of bedding, than a foot or more of wet and dirty bedding on wet, unclean floors. Hogs do not naturally require much bedding. The skin

of pigs is very sensitive to prickly, irritating trash often found in coarse bedding, and such material may cause skin diseases, especially in young pigs, and greatly aggravates cases of sore mouth, nose and tail. Bedding that becomes dry and dusty pollutes the air with fine particles of dust which, being inhaled, give rise to mechanical pneumonia and other diseases of the respiratory organs. Such bedding also is a favorable breeding ground for vermin. Leaves of forest trees and wild grasses are the primitive bedding for hogs, but millet hay, prairie hay, timothy, alfalfa and clean rye or wheat straw, with but little chaff, are the best bedding materials that can be secured cheaply and abundantly. Chaff in grain straw irritates the skin.

YARDS AND INCLOSURES.

A hog-farm should be fenced hog-tight, so that one may know that one's own hogs and those belonging to neighbors are securely enclosed. The result is protection of the growing crop and against disease and the use of pasture and fields by the herd, thus affording a saving in production by utilizing waste feeds that are scattered over the farm. Hogs acquire the rustling habit when given such freedom that does much to promote health, especially in breeding herds. It is not practicable to give fattening droves such a wide latitude, but it will be found of great benefit to hogs in the developing stage. Young hogs require yards large enough to yield them

a sufficiency of pasturage and forage. Experience shows that it is not best to place any great number of hogs in one bunch; 10 to 15 pigs will be sufficient for a lot of four acres of alfalfa, clover or other pasture crop. Of course at short intervals the number of hogs can be increased, but to economically use the forage it is best to produce an excess so that it can be mown two or three times a year. This also provides tender, succulent feed.

Yards or pens that are necessary about the individual or centralized houses need not exceed an acre in size. Such yards may be plowed and seeded to rape or other annual forage crops—a practice that makes for healthfulness. Smaller pens, which immediately enclose farrowing quarters, need not be more than one rod square, and may be constructed of planks. Provide a well-constructed gate at one corner. Put a feeding floor in each pen. Panel construction is recommended so that the pens may be removed when not in use. For fencing small pens close woven No. 9 lateral and No. 14 horizontal hog fencing 26" high and of 6" mesh is the most satisfactory. For close yard fencing still heavier wire should be used, and a more open and lighter fence can be used in enclosing large lots, pastures and fields. A barbed wire placed underneath the woven fence will prevent hogs from rooting and crawling under. With two or three wires at the top an ideal farm fence is established.

For posts use well-seasoned native timber, cedar

or hedge treated with creosote; these will last eight to 12 years. For close yard fencing the posts should be placed 8' apart and 2' to 3' in the ground. In height the posts may be alternately 4½' and 3' above the ground. All corners of fences should be securely braced; all gates should be of plank or steel with woven wire and provided with secure fastenings. For open field fencing posts may be 16' or even a greater distance apart, using shorter posts between. Where hog fences cross gulleys or draws, stones, logs or poles may be buried in the ground and the wires attached to them. In recent years the cheapness and durability of cement have led to the use of cement posts, which can be made on the farm at a cost ranging from 10 to 25 cents each.

SHED AND SHELTER.

Some breeders depend on large open sheds to provide shelter and windbreaks for their herds. These are often combined with cattle sheds or placed on the south sides of barns, granaries or cribs. This shelter is found to be cheap and useful in warm climates, but is not recommended for the extreme North. Such a shelter must have a weather-tight roof, sides and ends, the south side being left open to secure ventilation and admit sunshine. One great fault of large open sheds is that they are generally not divided into compartments; consequently the hogs overlie and pile up during cold nights and become too warm, and sweat. Then, as they separate

after sleeping and are exposed to cold air, they "catch cold," and develop lung diseases which are often mistaken for cholera. Another disadvantage of such sheds is the difficulty of keeping them in sanitary condition. I have never heard of a proper name for this method of keeping hogs, but I believe it might be called the "socialistic plan." While such a system may be permissible as a temporary substitute for something better, I would not advise its practice to any large extent in cold climates. When such a shed is used it will be found advisable to partition it off with short panels of fence, 3' or 4' in height every 4' or 6' of its length. This would divide the hogs into small groups and prevent the bad effects of crowding. Of course, such sheds must be liberally disinfected with lime, crude carbolic acid or other disinfectant and otherwise kept in as sanitary a condition as possible.

HOG TROUGHS.

The essential thing in a hog trough is that it may readily be cleaned. No trough, whatever the advantages claimed for it, should be used which has interstices or cracks in which dirt may lodge, and all practical plans tending to keep the trough free from dirt should be put into operation. My experience is that the simplest and cheapest form of trough is also the most satisfactory for general use. The old V-shaped trough, when properly made and mounted upon a platform to aid in keeping it

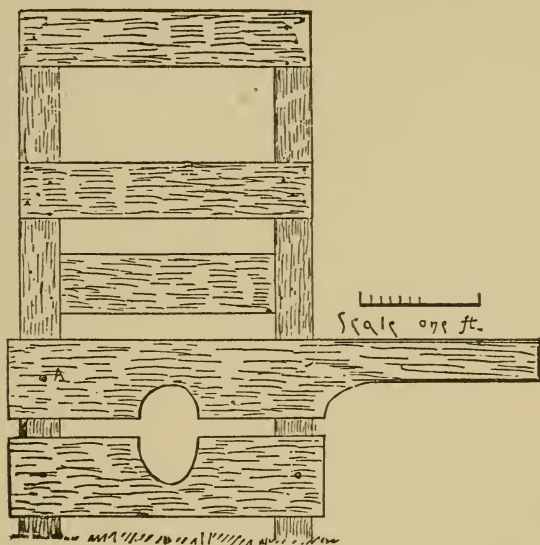
dry and clean, is hard to improve. For all practical purposes, from 6' to 10' will be long enough to build it. Its capacity should be sufficient to hold at once the entire amount of any one meal. If feeding troughs are not placed on platforms they should at least be on high ground to minimize dirtying by the pigs' feet, although there will always be a certain amount of that, especially if the trough be near a mudhole. It is a common practice to put swinging panels in the fences of hog pens so that the troughs can be filled without entering the pen and without the interference of the hogs. Flumes may also be arranged to carry slops through the fence and these devices are quite satisfactory. On the whole, however, I prefer the movable trough, placed high and dry where it can be easily kept clean.

Troughs constructed of iron or steel and of galvanized steel or of concrete, having rounded bottoms placed upon platforms and where the sun can shine direct into them, also constructed so that they may be easily flushed out and kept clean, are commonly accepted as ideal hog troughs from practically all standpoints, especially sanitary.

A DEVICE FOR HOLDING HOGS.

The device shown on page 117 for holding hogs by the head while ringing is simple and cheap in its construction and easy in its operation—so simple, in fact, that the mere illustration furnishes all the specifications necessary. The uprights should

be firmly set in the ground and the upper piece of stocks pinioned to the upright on a pivot at A. By nailing boards to the uprights on both sides in the



rear a small chute may be formed by means of which the hogs may easily be driven into the "trap."

HERD MANAGEMENT.

There is much misunderstanding of the application of the terms "quality" and "finish," and it may not be amiss to give the meaning of these terms as they have been used by experienced breeders. All through my career these terms have been applied as here outlined, and all my judgments of individuals, types and breeds have been made with a broad interpretation of them. When our score card was revised in 1896, the committee on revision, without question, gave these terms their broadest meaning and application. Quality may mean several things, according to the application of the term to the different parts of the hog. Broadly defined, it means the character, fitness or mark or stamp of excellence, of any part of the hog, or of all the essential parts or points that may be classed together or distinguished from one another on account of their peculiar uses to the hog or in his pork product. So the word when applied to the hog may be used broadly and to cover nearly all his points and uses. This has been the usage among breeders and feeders for 60 years, to my own knowledge. They spoke of the breeding, feeding, maturing, shipping, show, developing and pork qualities, and of many other lesser qualities that made up the hog. They judged these qualities by the character and construction of the

meat, lard, bones and hair, and as they noted their adaptability for different purposes, quality was the main defining word used. The word even goes on to the stockyards and through the packinghouse to the consumer's plate.

In breeding herds the term quality gives the measure of the value of reproducing individuals, and all breeders have learned to discern such values by a conformation that quite accurately stamps the individuals as breeders or non-breeders.

Finish is not the same as quality, but it is the high state or degree of development of quality. Finish is accomplished only after all quality has been developed. So often the finish of one individual is not as high as that of another, as its inherent and developed quality was of a lower grade. The best outward indications of finish in a hog of high quality are the absence of creases, lumps and over-development, and, on the other hand, a good condition of body, meat, hair and skin. Animals with fair-sized strong bones, evenly-constructed bodies covered with fine coats, with firm but fairly thin skins, and producing meats of fine texture; that conform closely to the characteristics of their breed, and that have indications of possessing and developing high quality may be credited with high quality and finish. The score card treats largely of size, color, condition, disposition and action in hogs. But in the case of each of these there must be reckoned the quality, finish and symmetry of the points, and although neither quality nor finish is given any stated percentage of the make-

up, every point and part must have a preponderance of both in order to qualify. Many people mistakenly regard symmetry as synonymous with quality and finish. Although there exists some connection between the terms, the word symmetry really means the similarity in shape of the parts of both sides of the body, so that each side of the body is exactly like the other and both combine to make perfect animal form.

SELECTING BOARS.

To select a boar to head a herd is a responsible undertaking, as the boar is generally credited with exerting more influence than the sows in forming the general type in a herd. Much should be known about the bloodlines and the general type of his ancestors for a few generations back. If these are favorable, close inspection of his individual merit is of next importance. He should be a true type of his breed, and in every case a better individual than the average of the sows. If he is inferior to them improvement cannot be expected. He should be strong in points wherein the sows are weak, so that the common demerits of the sows may be corrected in the progeny. The crossing of extremes in conformation is to be avoided; use boars mainly as correctors. In the selection of new and distinct blood the powerful influence exerted by the sire in doing either great good or great mischief should be considered. To some extent the general make-up of future litters of sows bred to boars of like type can be forecasted. In many cases, however, even where

the boar is of the same type as the sows, the breeding back of him makes the type of future litters very uncertain; he does not make a good "nick." How important this is every experienced breeder knows.

I urge a careful study of a boar's immediate ancestors as a necessary part of a man's business in selecting a herd-header. The boar should be constitutionally strong and vigorous, of good size for his age, in good health, free from lumps and wrinkles and without serious defects. The back should be fairly long, even, broad, full, strong and slightly-arched; his frame larger than that of the typical herd sow; his bone strong and of close texture; his legs straight and set wide apart, giving evidence of plenty of room for heart and lungs; his carriage free, with action and style; his pasterns short and strong, so that he will stand on his toes. He should possess easy feeding qualities. The better the sows individually the better the boar should be, and the better he is the better the pigs will be.

SELECTING BROOD SOWS.

Figuratively speaking, the sow is the seed-bed, and the boar the seed. Good seed will do better in poor seed-beds than poor seed, but to secure the highest reward in results the seed-bed must be relatively as good as the seed. The only true course in the up-building of types is by the use of good seed in good seed-beds. This involves the correction of all deficiencies, by matings of sows with males of the same breed which are strong in the points which the

sows lack. To mix breeds or to practice cross-breeding is but to tear down the structure and eventually the foundation of the types which it has taken breeders years to build. The selection of the brood sow, therefore, is as important as that of a herd boar. One of the first considerations is fecundity. Find out about a sow's ancestors; her pedigree should be examined and her conformation studied. Many breeders select their breeding animals at six to eight months old, deciding, from characteristics of form which individuals give the greater promise of breeding value. They cull all those with a tendency to mature too quickly in frame, and that promise to mature into finished pork at small weights. These are fed for market and slaughtering. The others are retained for future trials in the breeding herd, with the certainty that some of them will be discarded after their first litters.

In selecting a brood sow I would have the size of the animal fairly large, of good length and depth, not compact nor yet too loosely constructed. The back should be straight or slightly-arched, even and full, with the rib line even and well-extended from loin to shoulder, the rump and top of the ham broader than the top of the shoulders and the width through the hams more than the width through the shoulders. The loin should be developed fully to the lines that are even with connecting points. The bone should be firm, strong and of good size; the general frame of the sow may be slightly rangy; legs straight and set wide apart; hoofs round with

short pasterns, and standing firmly on the toes without dew-claws touching. The sow should possess free use of every part, showing good carriage, free action and some style; head and ears medium in size, broad in the face between butts of ears and eyes, tapering down to the end of the nose, which may be longer than that of the boar; jowl clean-cut and comparatively free from fat. The neck need not be full or wide, but may be generally narrower and sloping to conform with the shoulder, and without wrinkles or creases. The heart girth must be good, showing good width between the fore-legs and be in proportion to the length of the body. The sow should be free from blemishes and over-development of fat in any part of her body, which should be of a muscular, bony build, thus insuring reproductive vigor.

The udder should be naturally well-developed. To show indications of a full development for the nursing of eight pigs is considered better than a development for a litter of 12. The function of a brood sow is to produce, in large numbers, animals whose frames permit easy and quick maturing into finished pork. Sows must possess deep, well-rounded hams that have the large end up; broad backs filled with meat and lard, deep, wide bacon sides that have streaks of fat and lean in them; and shoulders well-filled and covered with some fat, with the larger part of the shoulder up.

It is better to secure a few sows possessing the leading characteristics than to have many that do

not. Sows so strong in type and blood that they will reproduce themselves may be termed brood sows.

AGE OF BROOD SOWS.

Nature must be given plenty of time in which to mature breeding animals. We cannot expect immature gilts or fat sows to be as prolific or produce as strong and healthy litters as older and maturer brood sows. As the matured brood sow ages her usefulness decreases until it becomes unprofitable to keep her. Gilts should be annually selected to take the places of retired sows. Spring gilts can only be considered experimental brood sows, and in selecting them double the number actually needed should be placed under observation. Fall gilts are more promising brood sows, as they are generally better developed, but it is not best to depend entirely even on them. I would keep a diversity of ages, from gilts to perhaps six-year-olds, culling out from time to time those that failed to be profitable, although it is well not to be too hasty in condemning gilts for small litters, as they sometimes prove the best producers and mothers on further trial. By filling in with younger breeding animals and discarding older ones an even balance will be kept in the herd, and a practical demonstration of the success or failure of the bloodlines adopted and methods followed will be made. Pigs from matured sows are generally stronger at birth, have better chances to survive the first few critical days, seem to adjust themselves to conditions more read-

ily and to make better growth, with but few of the troubles that affect small pigs, than do those from immature sows. Nearly all winning show animals and the best bunches of pigs or finished hogs are from matured dams. Mature sows are apparently more prepotent than gilts; the latter farrow pigs that finish frame growth at too young an age. As to the extreme limit of age, there are instances of sows breeding until foster mothers must be used to nourish their pigs. Generally speaking, best results are obtained before the sows reach the eighth year.

CARE OF BOARS.

The boar is the head of the hog family, the "master of the harem," the heart or "germ seed," and center of the pork-producing plant on the farm. After ascertaining that this seed is pure and of excellent quality, it becomes most important that all conditions are fulfilled to get the greatest benefit of his qualities. No matter how good the blood, or how superior the individual, the care, the feed prior to, and his physical condition during the breeding season regulate largely the vigor and value of his offspring. If the boar has been purchased, feed him as nearly as possible as did his previous owner, and any necessary change in diet or care should be made very gradually. His yard or inclosure should be at least 100' square; it would be much better if it were an acre seeded with alfalfa or other forage. The lot should have good drainage and shade; a warm, dry house placed conveniently so that the

hog may be seen easily and often. The house should have a small, high and tight pen enclosing the opening, sufficient to give the animal exercise during periods when it is best to guard his safety. This last precaution is especially necessary during the night and in the breeding season. The large lot should be enclosed with a moderately high, tightly-woven, heavy wire fence, with posts at intervals of at least 8', and one or more barbed wires at the bottom and on top. These yards should not adjoin each other directly or the yards of the brood sows. It is not essential that the boar be provided with cement feeding floors; if any floor is needed, a small wooden platform can be arranged. The feeding trough should be wide and of fair size, and should be discarded, and replaced with a new one, at least once a year. Muscle and bone-building rations should be fed, with plenty of pasturage in the summer, and a liberal supply of alfalfa, hay and roots in winter. Corn may be fed daily, but not excessively, and with a slight increase just before and during the breeding season. The main feeds used should be shorts, oats, oilmeal and milk. The boar should always be kept strong, healthy and vigorous, and should not be allowed to become either too fat or too poor. The balance can be regulated by raising or lowering the balance of his rations.

For best results, the practice of breeding one sow daily, or from 30 to 40 sows during the breeding season, each with but one service of natural duration, is best, and all that nature intended. If it be nec-

essary, however, and the boar is in proper condition, the services may be arranged at 12-hour intervals for a few days. But this is a bad practice to continue any length of time, although not as bad as allowing the boar freedom in the sows' quarters during the breeding season. Sometimes the boar's disposition may be quieted by letting an old sow run with him, and hard or shy breeders may be brought back this way, but the boar should be kept away from close contact with droves of sows. The sanitary condition of the boar's premises should be kept perfect, as disease may be spread quickly from such a center, especially during breeding seasons. He should be treated for lice and mange very frequently, whether there is apparent necessity or not, and should always have a liberal supply of ashes, coal and charcoal in his pen.

CARE OF BROOD SOWS.

Let us assume that the brood sow is of the proper type, in good condition, and is being fed a balanced brood sow ration when the breeding season opens. For spring litters, this season begins generally in the latter part of October and covers November, December, and the first part of January. May and June are the breeding months for fall litters. Age and maturity of sows have much to do with bringing about good results. Some types, breeds, and individuals develop and mature more quickly than others; so no definite breeding age may be determined upon in all cases. Perhaps the best rule would be

to avoid the farrowing by any sow before she is one year old. This will generally give time for gilts fully to mature. It is better to breed sows to farrow about the same time; this gives better results in size and uniformity of the offspring. The gilt is in heat about every 21 days after the age of four or five months, the period being from two to four days. The conditions are the same with older sows; those that have weaned pigs will come in heat within 21 days after entirely weaning, although signs of heat may be shown before then. The best time for service is about the middle or height of the period. The time of gestation varies from 112 to 118 days but is generally about 114 days. Pigs farrowed much before 112 days are usually weak and hard to save, and those that are farrowed after the regular time generally have some condition that causes considerable trouble in raising them. Experience has shown that the strongest and most easily raised litters are farrowed in or between the common minimum and maximum periods given.

After the sow has been bred she should be removed to secure quarters out of contact with other hogs, and there given a few days' rest. Feed during this time should be light, of laxative nature, and even temperature; her quarters should be dry, warm and sanitary. After the sow has been returned to her former yard the feed should be such as will grow muscle, bone and tissue, but not highly concentrated, and with only a small allowance of corn. Alfalfa, shorts, oats, skimmilk, a little oilmeal or

tankage, vegetables or roots, with plenty of pure water, plenty of exercise during the winter time, make an ideal regimen for the development of the sow and her foetal litter. In summertime plenty of pasture and shade must be provided, so that an even temperature of the body may be maintained, and where conditions are normal there should be no wallowing in mudholes or ponds. After 30 or 40 days the corn allowance may be increased slightly but never over-balanced. About three or four weeks before farrowing the allowance of corn should gradually be cut down and its place finally taken almost entirely by increased allowances of oats, shorts, brans and the like. Some breeders use a little oilmeal and tankage, but, where it is practicable I advise the use of ground alfalfa. The brood sow's balanced ration should include such grains and forage as are produced on the farm. In any feed mixture it is essential that there be no deleterious substances. The feeds must be muscle, bone and tissue-builders and, in the latter part of the gestation period, laxative and fever-allaying. During this time it is essential for the sow to take plenty of exercise daily for her digestion and assimilation to be regular. The bowels must be regular but not over-active. This condition will prevent or allay fevers and many other farrowing troubles that affect the sow and her litter.

Great precaution must be taken upon the approach of parturition against possible injuries by other hogs, fences or other obstacles, or by anything that could force the sow's body over high objects

or through small spaces. About the hundredth day the sow should be accustomed to her farrowing pen by confining her in it every night and giving her exercise during the daytime in a yard enclosing it. Attention must then be given to the farrowing signs. Among these are the filling of the teats and the udder from which a watery or milky substance can be obtained by stripping 24 hours before the end of the period. Another sign is her carrying of litter or bedding and the construction of a nest. As the hour of farrowing approaches, the pains of labor produce a condition of enforced quiet and the sow takes a recumbent position. Then the man who has fed and cared for her properly has but little to do beyond giving each new arrival its first assistance and counting the youngsters. They are generally able to care for themselves afterward.

The condition of the brood sow during pregnancy and motherhood should be made as favorable as possible to the full development and upkeep of her body and its functions. She has a double strain during gestation—the development of herself and of her foetal litter—so should be neither too fat nor too lean. Her care, feed, sanitary condition, exercise and general condition control in large measure the fate of the litter.

In yarding brood sows, discretion and judgment must be used in getting together those inclined to be of the same temperament and those requiring and eating about the same amounts and nature of feed-stuffs. The most ravenous, strongest, and ill-tem-

pered sows should be allowed to contend against one another, while the milder-tempered sows should be segregated, and the result will be an approximately equal distribution of feed.

FEEDING THE HERD.

There is a great difference in the feeding of breeding stock and of fattening stock, and small liters and unprofitable returns in the hog business can be attributed largely to the breeder's lack of discrimination in his methods of care and feeding. Many men lose sight of the fact that the frame must first be constructed, and that breeding animals must be supplied largely with feeds that will develop muscle, bone and tissue, as well as with heating and fat-making feeds (carbohydrates). The individuals of the herd have been selected on account of their promising fitness for breeding. They are usually of superior frame development, and should be easy-feeding and easy-maturing animals. After they have been selected their feed should be of a highly developing nature, but at no time excessively fattening nor too strong in protein. They should have access to pasture, and receive plenty of exercise. Always remember that the intention of feeding is not to fatten, but to produce an animal of large frame that is meaty and well-developed in every way, and that such feeding must also supply these same elements of strength for the development of reproductive power. These considerations show the necessity of feeding liberally high-protein feeds.

Breeding animals possessing such conformations and receiving such care and feed as here indicated, are not only satisfactory in size, vigor and constitution, but endow their offspring with these qualities. Before the breeding season, it is best to increase the allowances of heat-producing feeds, as this is required by some individuals fully to develop their breeding powers. After the breeding season the ration should be much the same as before, gradually increasing its grain, and compelling plenty of exercise. During the early winter or when pasture ceases to be sufficient, roughage should be supplied. A ration of alfalfa, wheat, oats, corn and oilmeal may be ground and mixed and fed wet or dry, although it is better to feed it as a thick mash in troughs or on feeding floors. As farrowing time approaches, it is essential that the digestive tract be kept in a perfectly healthy condition. Avoid constipation.

Dry, warm and clean sleeping places must be provided. Nearly all heating feeds should have been discarded two weeks before farrowing, and the sow's ration composed of such cooling and laxative feeds as alfalfa hay, oats and bran, with very little corn. But the ration must not be made too laxative nor lack in nutriment. This treatment will prevent fever in the mother and give the young pigs the best possible start. During motherhood, the feeds after a few days should be gradually strengthened until it is of a highly developing nature. It is important to remember that feed even

now must develop the bone, muscle and tissue of the young pigs through the agency of their mother, as well as nourish the sow herself.

When weaning time approaches the feed for the dam should be stronger in grain and she should be kept away from her pigs for several hours at a time. Meanwhile the pigs should be receiving sufficient feed to carry them over her absence. By this method the sow will begin naturally to dry up, and the pigs will naturally wean themselves; so that final weaning will not be harmful to mother or pigs. After weaning, the sows should be placed in yards containing green feed and fed lightly on grain for a few weeks, then gradually placed on a strong brood sow ration—which means a more liberal allowance of grain to prepare them for their next breeding. Mature or old sows do not require any great amount of protein when being carried over, but should be given more liberal amounts of carbohydrates during pregnancy and motherhood than are given to younger, developing sows.

POINTS ON FARROWING.

Every hograiser should keep a record of each brood sow, including her breeding and farrowing dates, and facts about producing and maturing qualities and the disposal of her litters. By such a system the owner is enabled to determine each sow's individual worth as a brood sow, and to know with certainty her farrowing time and when to transfer her from the herd to an individual farrowing pen.

Signs of approaching maternity in brood sows are extreme fulness of the belly and the filling of the udder and teats until they are full and smooth in appearance. Investigation should be made of these every day for about a week before the farrowing date. Sows also show that farrowing is near by restlessness and by collecting material for their farrowing beds. While the sows should previously have been allowed plenty of exercise during the day time, they must now be secured in farrowing pens to which they have become accustomed by sleeping in them for a week or more. When these signs are noticed the hograiser should arrange his farrowing pens and fasten the sows within, with the expectation of litters within 24 hours. The bedding should not be excessive, and should consist of clean, dry millet, hay or rye, or wheat straw. Mature sows or those that have had previous litters, and have been properly fed and cared for with farrowing in view, need little assistance at farrowing; they require for the most part close observation so that aid may be given should occasion require. It is always well for someone to be on hand at frequent intervals for 24 hours before and during farrowing. Many pigs are lost by lack of attention or over-attention. Sows differ largely in temperament and the hograiser should be governed by this fact and other conditions, such as weather and difficulty of labor, in giving assistance, that he may make the whole process of farrowing as nearly natural as possible. More attention is required during the cold months, as the

pigs may chill before they suck. This makes it advisable artificially to heat the pens during farrowing or to heat them by means of jugs of hot water or hot stones or bricks, wrapped in cloths and placed in barrels, boxes or baskets.

When the sow shows signs of sickness by taking a recumbent position, investigation will show that parturition has started; a watery discharge from the vagina will be noticed. The sow must not now be disturbed by noises or attention, and every precaution must be taken against them. If the sow be of a quiet disposition or will permit of handling, it is best for the attendant to take a position from which he can quietly secure each arrival in folds of cloth or sacking, wiping their nostrils and mouths clear of all matter which would suffocate them. This will also prevent chills. The pigs should be given a chance to suck as quickly as possible after drying, and, if they do not naturally suck, should be aided by stripping milk into their mouths. If the weather is cold, the pigs and dam should be covered with a light blanket for a few hours. This should then be removed gradually, to prevent chills, and natural conditions established. Should the sow be feverish, restless, cross or unnatural, it is often advisable to place the litter between suckling periods in boxes with artificial heat, until the dam shows a natural and motherly disposition.

The afterbirth generally is the end of farrowing, though not always. It should be removed from the pen and either burned or buried, as its consumption

by the sow is of no benefit, and often causes harm. Sows given brood sow rations seldom show any inclination to eat the afterbirth, while those in improper condition invariably do.

The use of instruments should be avoided when natural farrowing is in process. If there are intense pain and labor for an hour or more without results, an instrument may be used after being antiseptically cleaned, and oiled with lard or linseed oil. The insertion of forceps will often turn the pig into a position where proper emergence will result. An injection of medicated linseed oil is often an effective aid.

Pigs are farrowed either fore or hind legs first. They sometimes become doubled, however, so that they will not pass through the opening of the womb, and have to be straightened out by using forceps. Where forceps are used, great care must be taken not to injure the inner lining of the womb and the unborn pig. After a secure hold has been made of its legs or head, so that it will come forth naturally, a slow steady pull should be given, as an aid to the sow's labor, holding all the gain until an issue is effected. Another method for getting the young pig into a proper position for easy birth, and one which I personally prefer to any method involving the use of instruments, is injection of warm water and oil with a hose. After the injection the sow should be kept with the rump lower than the head.

Oftentimes pigs apparently are dead, from this treatment or other causes, when they first come

Many of these may be saved by immediately wiping out the mouth and nostrils, pulling the tongue down and forward, and inducing artificial respiration by gently forcing the body from a straight to a bent or doubled-up position and blowing air into the pig's mouth. If it does not respond to such treatment within two minutes there is little chance of recovery. If there be any trace of heart action pigs are sometimes revived by stimulants, such as three or four drops of whiskey in a spoon of cow's milk, or they may be rubbed with a cloth saturated with whiskey or alcohol.

During farrowing the house should be kept as evenly-heated as possible, and free from draughts of cool or too hot air. The pigs must be allowed to suck at least every 10 or 15 minutes during the first few hours of life and at least once an hour when about 24 hours old. Sunshine is of great importance to newly-born pigs. It apparently imparts strength and causes a filling-out of their bodies, giving them a condition and appearance which no artificial heat can produce.

The dam's feed for 12 hours previously to farrowing, and 24 hours following, should be little more than tepid water. If the sow is in excellent condition, a light slop of bran, shorts or ground oats may then be given, slightly increasing in richness for a few days until the desired balance in the ration is reached.

Sometimes from different causes a sow reaches a state in labor where artificial aid threatens her

life. The best treatment at this period, if she has farrowed part of the litter, is to place the sow in a mud bath and take steps to allay the body and milk fever. Often the sow will live through the process of passing the dead parts of the unborn pigs and recover her former health and usefulness.

RUNTS AND BACKWARD PIGS.

When the growth of a pig is arrested and, in spite of the usual methods of care, the animal refuses to develop, the blame may be laid either to its breeding or to causes operating after birth. Only in the latter case is the tendency remediable to any great extent. Inbreeding, carried too far, often results in this unwelcome class of pig, while unwise crossbreeding will have the same tendency. The breeder who pursues either course too far will undo the building work of years, and end up by producing the kind of hogs that were outclassed 50 years ago. Naturally the only way to deal with such a situation as this is radically to change one's methods of breeding and choice of herd animals. When backwardness is due to causes arising after birth, it is an easier matter to deal with. The first cause of runts that can be detected after birth is lack of suckling capacity in the sow. If the litter is larger than the sow can take care of, the stronger and better-developed pigs get their share of the milk, and then some, thus depriving the weaker of a fair share. The handicap increases as the stronger pigs gain, and an ill-assorted litter taling off with the weakest

runts is the result. The only way to head off this tendency is to supply the needed nourishment to the runts. Cow's milk should be given them, and the weaning should be hurried along so that they will have an early chance to feed and make up for lost lacteal opportunities. If necessary the weaker pigs may be transferred to another sow with a small litter, but if this is done it should be seen that the same lack of uniformity is not repeated. The pigs should be placed in a litter approximately in the same state of development as themselves and such a transfer should only be made when the pigs are less than a week old.

Pigs are also stunted by wrong feeding in their early days. Often the feed is not properly distributed, the stronger getting the lion's share and the weaker getting only half the necessary amount to keep up normal growth. Not only does this hurt the weaker pigs, but it involves a waste of feed, and even the stronger pigs may become runty from the very excess in their diet. To avoid this happening, only pigs of about equal age and size should be fed together, and all those that grow ahead of the others should be removed and fed by themselves.

Thumps, constipation, fever and other sicknesses also cause pigs to lose in growth, and appropriate measures against these ills should be taken. The best general treatment is to put the pigs to pasture with plenty of shade and pure water, and gradually to change the balance in the rations. The protein should be increased, giving such feeds as separator

milk, tankage, alfalfa, dry corn and middling slops in the summer, and cured alfalfa or clover hay, cooked roots, corn, milk with shorts and middlings, tankage and slops, in the winter, with free access to wood ashes and salt. Milk and good pasturage with a little concentrated feed will do wonders in bringing runts into presentable form.

WEANING PIGS.

Every breeder has his own method for weaning pigs. Methods vary from forced weaning at three to four months old to allowing pigs to wean themselves, or their mothers to wean them, at ages exceeding three months. Some breeders wean the pigs a few at a time until only the runts are left to dry up the dam. All methods have their drawbacks as well as their good points. Perhaps the best general method is to institute near as possible natural weaning, which can be effected by encouraging the pigs to form an early taste for warm cows' milk, corn and short slops, increasing the quantities of these until their appetites for them are well established. In this way the change from the dam's milk is made gradually, and most of the disadvantages of the various methods of weaning are overcome. The litter or any part of the litter should not be removed during this process. At seven or eight weeks of age the pigs should be freely eating feeds practically to full extent of appetites, hardly depending on the dam at all. About this time the dam's udder will begin to dry; she should then be removed to some tightly-enclosed pen out of sight and hearing

of her pigs. After a few days she will dry up completely. The pigs' rations of grain and milk may then be increased to take the place of the dam's milk, and the pigs will hardly realize that they are weaned.

Strong, Greedy Pigs.—"Robber Pigs" are produced for the most part by the practice of running litters of uneven sizes and ages together. It is only natural that under such conditions the stronger pigs will secure the feed of the weaker ones, and will extend their operations to all the other litters to which they can get access. The only cure is to segregate the robbers where they can only get access to their own dam, and then size up the remaining litters so that the inequalities which give rise to robbing may be eliminated. Much of the danger of robbing is removed by putting sows and their litters in individual one-acre pastures, or placing them, not more than two sows together, in small pens and houses. If large numbers of litters are in pastures together only very close personal attention and the prompt removal of robbers will prevent the evil.

FALL PIGS.

Fall pigs, raised under favorable conditions, may be made almost as profitable as the spring litters, and, in fact, two litters a year are necessary if the hog-farm is to pay adequately for the outlay and labor it exacts. Where feed and care are properly given, the raising of two litters a year will actually improve the breeding stock. Plenty of home-grown forage and adequate housing are the necessary con-

ditions to success in fall operations. Pigs farrowed during the latter part of August and up to Oct. 1 are best adapted to carrying over and developing during the winter. Their care during infancy should be similar to the care given spring litters, but as weather conditions are better in the fall it is a matter of less anxiety. On the other hand, fall pigs must be weaned earlier and be able to eat and entirely independent of their dams before cold weather sets in. During the early fall, so long as the weather is favorable, young pigs should be developed as much as possible by exercise and plenty of such forage as alfalfa. This treatment makes the body firmer and more closely-grained than that of the spring pig, and my observation is that this difference enables them to stand stronger feeding earlier in life than the spring pig can stand. Corn, wheat, shorts and milk are the basis of this feeding, supplemented by alfalfa or hay, which will replace the earlier pasturage, when that is out of season. This latter can be given in the natural state or ground and mixed with the other feeds mentioned, with a little oilmeal or tankage added. Root feeds, slightly cooked or raw, may be added, and pumpkins or squashes will be found good appetizers and correctives of digestive troubles. In cold weather the drinking water should be heated to between 70° to 80° F. always above 50° F. It is advisable to soak or slightly steam the alfalfa, corn, wheat, oats, tankage combination and to feed it in a thick mash. Grains and shorts may be fed dry with liberal allow-

ances of drinking water, and free access to alfalfa, ashes and salt.

The sanitary condition of fall pigs should be watched closely. They should be in bunches not to exceed 12 or 15, confined little as possible, and be given opportunity to secure plenty of late fall green forage. Apart from the forage, their feeding should be on sheltered or covered floors. Their sleeping quarters, too, should be arranged so that they cannot pile up; to prevent this the nests should be partitioned off into spaces that will accommodate not more than five or six pigs. Steaming pigs, fresh from an overheated, close nest, on cold wintry mornings, shivering and hunting in snow or mud for their feed, contract colds and fatal cases of pneumonia. Pigs cared for badly and exposed to such conditions will never compete with pigs that have received adequate protection. Fall pigs following feeding cattle will be helped materially by it.

The skin condition should be especially well looked after in fall pigs. If lice make their appearance, not only must the skin be treated but the bedding and quarters should be liberally disinfected. Fall pigs as a rule develop more runts than spring pigs; these should be separated from the bunches in which they occur and fed especially on milk and warm slops, to hasten their development. If they do not respond to especial care they should be sold. In dividing fall pigs into bunches, their age, size and digestive capacities should be kept as equal as possible. Throughout the winter, feeding should be for

development; there should be no excess of fattening feeds, but with the advent of spring the grain allowance and fattening feeds in general should be increased. Pigs farrowed in September, with the best of care and feed, may be brought to 400 pounds by June of the following year, and it is not at all uncommon for bunches to average from 250 to 300 pounds. The cost of production per pound is but little greater than that of spring pigs of the same weight.

Breeders of fall pigs may be troubled by the natural tendencies of some of the boar pigs commonly termed as "ranters." They should be isolated or sold. Boars should be kept in bunches of approximately the same size, temperament and development. Those used for breeding purposes should not be returned to the bunch and the bunch should be kept away from the neighborhood of the sows. In many cases a good pasture is sufficient to minimize this kind of trouble from the boars. A few barrows, put in with the bunch, will also have a good effect. Lastly, it should be remembered that the feed must be highly developing, and for this purpose nothing supplements the corn better than shorts, tankage, alfalfa and good separator milk, with free access to ashes and salt.

SIZE OF LITTERS.

The size of the litter that can suitably be cared for depends largely upon the proper care and feeding of the dam, but her capabilities should never be pressed to the limit, and if the litter is unusually

large part of them should be transferred to another sow or given artificial nourishment. While 10 or 12 pigs can be taken care of by a dam of the best development under proper care and feeding, a smaller number is safer, and in a mixed herd of old and young dams seven or eight pigs is a practicable size of litter, with the older dams carrying 8 or 10, and the gilts five to eight. While as many as 17, 18 and even 23 farrowed, and 14 pigs of one litter have been raised without any runts, the breeder who produces six to eight pigs ultimately does best.

CARE OF SUCKLING SPRING PIGS.

For some time prior to farrowing and up to the weaning time it is important that the mother sow should be carefully observed. See to it that sanitary conditions surround her; be cautious as to the quantity and quality of feeds. On these factors depend the thrift and usefulness of early pigs. The pigs should be housed in warm, dry, clean, well-ventilated quarters, free from draughts and dust and independent as far as possible of artificial heat. The temperature should be about normal. It is not best to heat hoghouses far above the outside temperature or to allow it suddenly to change. Little pigs should not be placed too close to a heated stove, as sudden changes of temperature in their bodies give rise to many ailments. It would be better to remove the litter from the artificial heat or at a further distance from it when they are a week or more of age. Get them used to natural weather influences as soon as conditions allow. If properly constructed, individu-

al hoghouses offer ideal accommodations for young litters. Pigs should be exercised at an early age on favorable days. Drive the mother and pigs out of the house and around the yard. The sow should be fed outside of the house and the pigs encouraged to rustle around the yard with her.

Pigs over two weeks old will naturally begin to nibble at the feeds given their mother. They should be encouraged in this by placing, where it will be convenient to them and out of reach of other hogs, a small trough in which to give a small quantity of sweet milk, soaked corn, shorts, slops or ground or soaked oats when feeding their mothers. They will soon learn what the feed is for, but great care must be taken not to overfeed them. Gradually increase the amount each day, according to their needs, remembering that their main source of nourishment is the mother. See to it that they clean up what is given them and are still a trifle hungry after each feed. This is important, as overfeeding destroys the future usefulness of thousands of pigs. To start right is a great aid to success.

While getting pigs on feed we must not overlook the mother. She should have feeds that produce bone, muscle and milk. It is well to know the quantity and quality of what she consumes, as brood sows will often eat material that is detrimental to them and their pigs. If the sow be excessively fat use milk-making feeds—those rich in protein; if in high breeding condition give her an even-balanced, developing ration; if in poor condition, and the litter

promises to be quite a drain on her system, give her feed that will produce both fat and milk. When conditions are kept nearly natural, the sow and litter will have little need of drugs and tonics, but they should be supplied with charcoal, ashes, lime and salt and their sleeping and feeding quarters kept in a sanitary condition, by cleaning and disinfection.

As the weather grows milder the sow and litter should be encouraged to make use of the pasturage in their yards. At weaning time the pigs should be so well advanced as to be quite independent of their dams for sustenance, so that they can be easily weaned without appreciably upsetting them.

PIG-EATING SOWS.

The eating of her young by a sow generally results from lack of care and improper feed given for some time previously to farrowing. As a result she is out of condition and craves essential mineral and body building materials. The sow is generally costive and feverish, and farrowing is usually attended by many minor troubles. The little pigs (also usually not natural) cause annoyance and pain in sucking, and the sow becomes irritated. This coupled with her craving for flesh-forming feed, causes her to eat her offspring. Relief to her irritation and remedy of her craving requires time to effect, for the trouble is from long-standing causes. Watchful attendance on the sow and litter is required, and laxative and fresh fatty flesh feeds should be given first. Tankage may be included after the first 24 hours, and these will

eventually stop the unnatural craving. Sometimes it is best entirely to remove the litter from the mother until she ceases to be cross and feverish. In this case they should be allowed to suck at intervals, under protection. Some breeders give a small dose of laudanum to produce restfulness and to help allay the fever. If the sow is costive, injections of warm Castile soap-water with castor oil will remove hardened feces and help to promote bowel action. If there be inflammation or fever in the udder treatment should also be given to reduce it, mud poultices, hot fomentations, or hot cloths being beneficial for such trouble.

THE ROOTING HABIT.

Nature provided the hog with an "appendage of independence," and when not adequately provided for the animal "roots for a living." Hogs relish herbs, roots, grubs and mineral substances found in the soil. If supplied with ashes, charcoal and grit the instinct to root will be less assertive, although hogs will dig around alfalfa and clover plants and root up the soil in cool and shady places in which to rest in the heat of the day. So far as the hog is concerned, the rooting habit is not harmful, but rooting destroys grass and growing forage, and as the habit grows and is rewarded by edibles they come to depend on it to such an extent that their other feed does them little good. The best treatment is to supply materials that will satisfy their craving. As a last resort rings may be placed in

their snouts. By the time these drop out, they will have largely forgotten the habit. Avoid ringing hogs, especially brood sows, too deep, and do not uninterruptedly continue the practice, for hogs must root some. Cutting the snouts to break the rooting habit is a reprehensible practice.

CHICKEN-EATING HABIT.

This habit is generally contracted by carelessness in the disposition of dead fowls, or in the care and management of poultry. Once acquired, it is very hard to break, especially in older hogs, while a young pig by isolation from poultry will lose its taste for this kind of meat. Various contraptions and methods are used to break the habit. My advice is to market the chicken-eater unless it be a show hog. Chickens should not run with hogs. The hog is carnivorous, and chickens tempt it. Liberal feeding of meat will often satisfy the craving. Some breeders have used tankage successfully in curing the habit.

BREACHY HOGS.

Hogs contract good or bad habits much the same as men do. The care, feed and condition of their inclosures have much to do with their forming habits. Irregular feeding, under-feeding and forgetting to feed cause them to seek feed elsewhere. If not fed and watered they become as unwilling prisoners, and inevitably find weak places in the fences surrounding them. Escaping, after being driven back a number of times with dogs and clubs, they learn to

be cautious, and to use some ingenuity. Other hogs learn the trick under the leadership of an old sow or other breachy members of the herd. All fences, gates and buildings should be of standard construction and kept in good repair. All hogs that show breachy dispositions should be placed in quarters from which it is impossible for them to escape. The herd should be supplied with fresh water and plenty of feeds of different varieties and at regular feeding times.

RECORDING HOGS.

In order that a hog may be eligible for record it must have an unbroken, recorded lineage on both sides to the first recorded swine of the breed. It is therefore of the utmost importance to keep the chain of record unbroken, as it is difficult to collect data and information necessary for record, if it is not done at the time of breeding. On the other hand, it is easy to keep a record of all breeding operations as they take place and to write up the pedigrees of the animals bred. Blank pedigree books may be purchased at the rate of 1 cent a form. These forms contain blanks for the dates of farrowing, the number and sexes of pigs, by whom bred, names of sires and dams, their numbers and full pedigrees, as well as spaces for identification marks, owners' names and the like. In order to record swine it is absolutely necessary to fill out the date of farrow, the number of pigs in the litter, proportion of each sex, breeder's name and address, sire's and dam's recorded names and numbers, and breeder's and own-

er's signatures. It is advisable to fill out all the other blanks provided. The breeder should not attempt to offer an animal for record unless it is distinctly above the average of merit of its type. The purity of blood alone is not a sufficient cause for record and unless the pure-bred animal has something to show for its blood it should be marketed. It is unfortunately true that many pure-bred "scrubs" have been recorded. Breeders who thus seek to add value to inferior stock inevitably are discriminated against by the best class of buyers.

IDENTIFICATION MARKS.

For purposes of identification, to insure correctness in keeping records of pedigrees, and to establish a mark to denote ownership, various forms of marking are in use. There is no best way; every method has its drawbacks. Buttons or metal clips in the ear lose or tear out; cuts or punch holes along the edge of the ear grow together, or are torn and disfigured; indelible marks are effaced by wearing. I favor marking pigs at two weeks of age with a common harness punch, using one-half of its cutting circle in marking notches in the ears. I use it on both ears, taking little nips out of the lower edges. The plan is adapted to 36 sows or it can be changed by placing marks in the tips, middles and butts of the ears to carry fewer marks on the ears and yet accommodate 100 sows. Of course a record will have to be kept in connection with it to give a key. For a start the following is given, the upper figures

representing the right ear and the lower figures the left:

LITTER OR SOW NUMBERS.

No.	The ear marked and number of marks in it.		No.	The ear marked and number of marks in it.	
	Right ear.	Left ear.		Right ear.	Left ear.
1.....	1	0	19.....	3	5
2.....	0	1	20.....	3	6
3.....	1	1	21.....	4	1
4.....	1	2	22.....	5	1
5.....	1	3	23.....	6	1
6.....	1	4	24.....	4	2
7.....	1	5	25.....	5	2
8.....	1	6	26.....	6	2
9.....	2	1	27.....	4	3
10.....	2	2	28.....	5	3
11.....	2	3	29.....	6	3
12.....	2	4	30.....	4	4
13.....	2	5	31.....	4	5
14.....	2	6	32.....	4	6
15.....	3	1	33.....	5	5
16.....	3	2	34.....	5	6
17.....	3	3	35.....	6	5
18.....	3	4	36.....	6	6

PLAN FOR EAR-MARKING HOGS.

Succeeding diagrams show a system used by A. J. Lovejoy, who thus explains it: "After using different breeding records for many years we put in a card system for keeping records. We index our cabinet by number and give each sow in the breeding herd a number. For each litter she produces we fill

INDEX NO. ()

BOARS () SOWS ()

SIRE

FARROWED

DAM

SEX	NAME	NUMBER	SOLD TO	PRICE

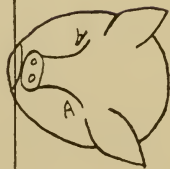
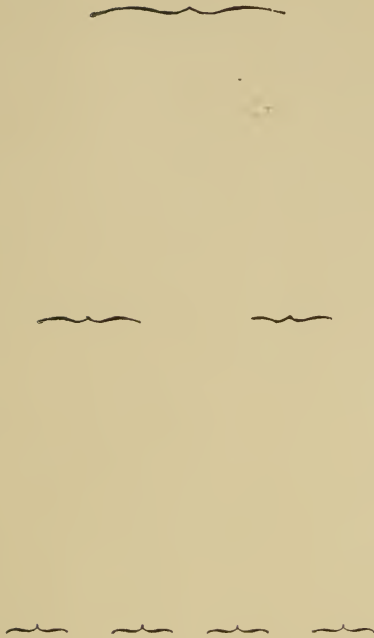


out a card giving the number of pigs farrowed, number of boars and sows, date of farrow and the sire of the litter. At the bottom of the card we mark on a pig's head (made with a rubber stamp) the way the litter is marked. When we sell any produce from the litter we have to write one for the buyer. We also have a small pocket memorandum book showing the various litters and how marked that we carry when we go out among the pigs. When a buyer asks how a pig is bred we look at the ear mark, then refer to the book and have the breeding for him at once. In this little book we put the sow's index number so we can refer to the cabinet when we get back to the office.

“In regard to marking pigs, there are two very good systems of marking by notches in the ears, made with a harness punch when the pigs are about two weeks old. One system is where you give each litter the same mark. This system we advise where the pig crop is large. It is as follows: Every notch of the outer rim of the right ear counts 1; inner rim of right ear, 10; outer rim of left ear, 3; inner rim of left ear, 30. For the first litter farrowed we place one notch in the outer rim of the right ear; for the second litter we put two notches in the outer rim of the right ear; this stands for two. For the third litter we go to the left ear and put one notch in its outer rim; this means three; for the fourth litter we mark one notch in the outer rim of each ear; this means four; for the fifth we put two in the outer right and one in the left—two plus three=5. For

DESCRIPTION

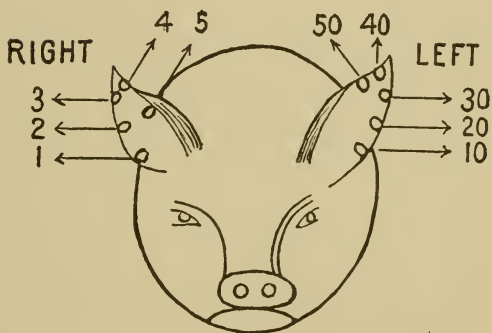
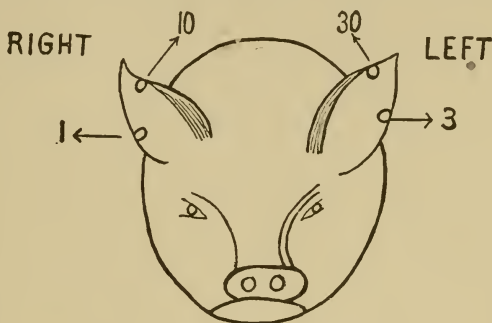
FARROWED



the sixth litter farrowed we put two notches in the outer left; this means six. For the seventh litter we put two notches in the left and one in the right. For the eighth litter we put two notches in each ear outer rim, making 8. For the ninth litter, three in the outer left ear, meaning 9. For the tenth litter we go to the upper right ear and put one notch in that place; this stands for 10. We follow up the succeeding litters by a combination of marks in the same way. We have found this method very satisfactory for keeping the records and when the breeding season starts we simply take the ear mark and the markings of white in keeping sisters (Berkshires) from the same litter identified.

“The other method say for 100 pigs and where one is dependent on outside help to attend to the breeders, gives each pig of a litter an individual mark and is as follows: The right ear has a notch close to the head which means 1; in the middle of the outer rim it stands for 2, and close to the top it stands for 3; just around in the inner rim means 4 and in the middle of the inner rim means 5. The left ear stands for just 10 times as much. Now for the first litter farrowed we start and mark one pig with 1 notch that stands for 1; the second pig we give mark No. 2; the third pig No. 3, and so on up as far as the litter goes by using a combination that stands for the number required. When all of that litter is marked we start with the next litter where we leave off and continue as before. You can mark up to 99 pigs with not more than 4 notches in the ear of any

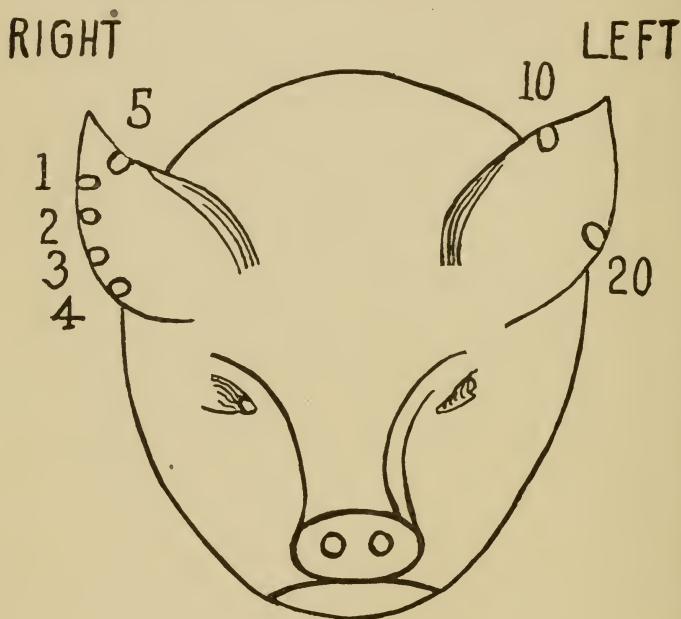
one pig; then when the breeding season starts you can go out and select the sows and decide as to what boars you wish them bred to; make out a list and leave it with the man in charge, saying breed gilts Nos. 8, 11, 23, 25, 30 to whatever boars you decide



on. When he puts a gilt in the breeding box all he has to do is to count the notches, look at his list and act accordingly."

Commenting on the foregoing or Lovejoy system an Illinois farmer writes: "Mr. Lovejoy's method requires a little book in case one forgets.

Here is a system (page 158) that is easier to keep in mind. In the lower part of the right ear are 1, 2, 3, 4. In the upper part of right ear one cut means 5; in upper part of the left ear one cut means 10; in the lower part of the left ear one cut tells the number 20 is on the animal; cuts on the lower and



upper ear left will mean 30; the lower and upper right ear will be 9, so the animal marked that way with 7 cuts will be numbered 39. This means the fewest cuts and is easier to remember—points of much importance to any busy man who values time and energy.

KEEPING RECORDS.

Every careful breeder should keep a record of each sow's performances so long as she is in the breeding herd. This would show which sows were profitable and those which were not. The keeping of such records also makes the business a matter of history and recorded experience. Buy a blank book, allot a page or two to each sow, ruling it off properly, and the breeder can record the essential history of his work in pork production. Records simplify collecting and referring to breeding facts, and are highly valuable in business transactions. Some day we shall require more vital data about ancestry than we commonly keep now.

Some men keep records of expenses and receipts, but this is not essential, and many of us would have to employ bookkeepers if we did likewise. A good plan to keep a record of breeding sows is shown:

Queen May 110113 S. Farrowed May 3, 1903.		Her mark. 1 R.		Sire, Poland King 26293. Dam, Queen Anne 101203.			
Bred Oct. 28, 1905.		Boar bred to. Prince Again 29281.		Due to farrow. Feb. 17, 1906.		Farrowed Feb. 18, 1906, 10 pigs. Raised 8.	
Identification mark.	Boars	3	Sold to J. Jones. [1] \$50	Sold to B. Smith. [2] \$40	Died young. [3]		
	Sows	5	Sold to J. Jones. [1] \$40	Sold to E. Brown. [2] \$30	Sold on market. [3] 230 lbs., 8c.	Keeping in herd. 4	Died young. [5]

Remarks—This was not a good cross; will breed her to Bill Taft for fall litter.

Note—The numbers are in brackets when hogs are sold or die.

ADVANCED RECORDS.

In large measure the improvement of a breed lies in the hands of a few men and even they do not work in harmony toward an ideal type. The result is that the great mass of breeders are left to their own resources in forming ideals of type, so that there really is no common ideal for guidance. Although the standard of perfection has contributed to breed improvement in the past, it has always been inadequate as a positive factor in breeding operations. Among the advocates of every breed there is much confusion as to type. There is need of an organization that shall bring the farmer, breeder, packer and consumer to understand their relationship to pork production. While it may not be wise at present to demand any radical changes in the type of the pork hog, the future demand will be for pork that contains more lean than fat, and the type capable of producing it will lead in popularity. There is no need to discard any of our popular breeds; the type can be changed to meet market requirements. Breeders inevitably make mistakes in matings, and why? Because they keep no record or history of the pork-producing qualities of their breeding animals. We have records that give the breeding of animals, but there is no record of conformation, size, physical measurements, show winnings, fecundity, and maturing qualities. No breed association has any fixed or compelling standard by which exposition and fair managements may be governed in selecting hog judges; consequently they

are left to their own resources, and generally select judges who favor a type locally common. So we find one type winning the most of the prizes at one state fair and an altogether different type triumphing at another. Therefore the breeder who studies types at fairs and by reading reports of them is left in a confused state of mind. The greatest need in the improvement of types is for a yard stick of performance to measure values. I urge the establishment of a system of records founded on principles rather than personal feelings or opinions. This subject is entitled to the most serious consideration by all breeders of pedigree stock.

BUYING AND SELLING BREEDING HOGS.

The hog breeder owes much to his fellows for the promotion of fair and square dealing in all their transactions. The great majority of stockmen are conscientious and square-dealing and upon them rests the whole structure of confidence that is built up in buying and selling, privately, publicly and by mail. That this state of affairs may continue there must exist between the buyer and seller a feeling of confidence broad enough to overlook many mistakes and oversights, as the possibility of error or misjudgment is always present in dealing with variable animals like hogs. Some people think it is wrong constantly to purchase sires from the same herd and of the same breeding, and it is their practice to buy from a different herd every season. This may work out all right if the purchaser is an unus-

ually good judge of hogs, but for 90 out of every 100 breeders and producers it will be best to note the families of hogs that are proving successful, to secure individuals that have this blood from some breeder in whom they have confidence, and to watch the results in their own herds. The success of this same blood in the breeder's herd may be watched, and if it is constant the producer may continue to get sires from this fountain-head until he finds that the type is departing from his ideal; then if the animal has proved a cross that is corrective, he may still use another sire of the corrective breeding; but if not then and only then is it time for him to look to other breeders for corrective breeding boars and sows. By so doing the producer is enabled to reap much of the breeder's harvest without much cost and experimentation of his own. This is the main reason for the existence of breeders in the first place, and producers should govern their business policies so as to make the greatest use of the good breeders' productions in order to keep up the quality of their stock.

Breeders should cull their herds very rigidly and feed for market all boars and sows showing any marked deficiencies. Just what percentage of each year's crop should be culled out depends much on the general type and breed, but it is a safe estimate that 10 per cent of any breeder's herd should be marketed, and some herds will run higher than 50 per cent. Conscientious culling should be regarded as a debt to the breed. The days of \$10 boars or of

neighborhood trading are past and should not be revived any more than the analogous practice of securing seed corn from unpromising sources. In this day seed must be pure and of investigated power of germination and production, and porkmakers have neither the time nor the money to waste on cross-breds, scrubs or renewed experiments along the lines of the fallacies of yesterday. The pace for the future is set, and it is almost furious in comparison to that of the old-time breeder, who did, however, accomplish wonders in evolving types. What the future holds in store for the betterment of the hog no one may prophesy, but it will be well for all breeders to be in line to mould their types into an accepted form before 10 years shall have elapsed—a realization of that for which breeders have been striving for centuries.

In buying or selling breeding animals the selection of individuals should not be made from the extreme developments of the general type of either herd. Corrections of type and better results in uniformity of progeny are secured by mating individuals of somewhat the same make-up, by using the boar as a correcter of the deficiencies in the herd, and increasing the effect by mating individuals possessing the stronger points desired.

Prices vary according to individual merit and bloodlines, and there is perhaps no hard and fast limit to the worth of an outstanding breeding boar. Some breeders fix prices by hundreds and thousands of dollars but I would suggest a more common use

of the hundreds. As a guide, it may be said that all boar pigs should be worth at least \$20 at any age, and if they are not they should be castrated. Gilts and sows can be figured at about the same price. In all cases, if there is suspicion in your or in the intending purchaser's mind of an individual being worth only about pork prices it is time to study your type and to think about marketing a good many of your pedigree animals. For in such a case something is wrong, either with you, your hogs, or with the purchaser's mind. When a prospective purchaser visits your herd the selection of breeding stock should be largely left to him, reasonable prices should be quoted, and if he buys he should be given a description of the animals bought and they should be marked so that he can designate the breeding of each one in the future. In guaranteeing, the seller should make no unreasonable promises, but should be willing to stand by those he does make. The pedigree should accompany the hog or immediately follow it. It is not necessary to record the pedigree for young pigs, so that it will be an easy matter properly to fill out a blank in a few minutes, and doing so obviates many errors.

Should the intending purchaser answer an advertisement and ask about certain animals the breeder should describe fully all the individuals that would approximately fill the order, and should make his prices a little higher than for a local sale, to cover the extra cost involved. As the selection is left to his honor and judgment, when the buyer is

not on the ground, he should send the best pig he has that fills the order. Such pigs are generally worth from \$5 to \$10 more and sometimes a great deal more than the general average price that can be obtained at home. When the purchaser accepts a certain pig, by all means send that pig or send his money back. If something should prevent his getting the right animal it is well truthfully to tell him why, and offer the next best or return his money.

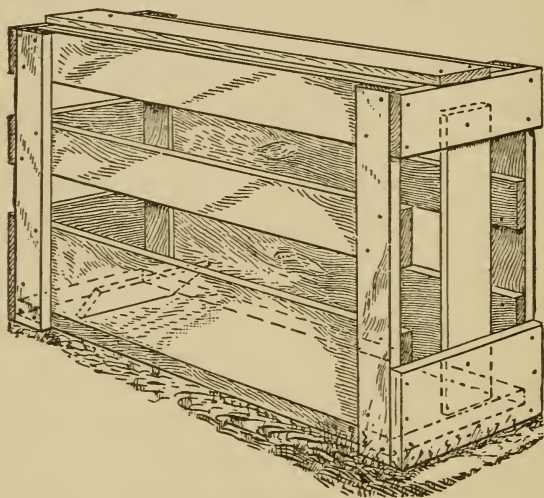
Several mediums are used to sell surplus breeding hogs, and each has its good features. Many breeders have a home trade that will take all of their annual surplus. Others advertise, and if they have a type that is acceptable to the public they dispose of their surplus at a profit. Some breeders hold annual or semi-annual sales of their surplus, which are much like private expositions of their breeding animals and of their year's advancement. Of course such sales also should be well advertised. And this plan, if properly managed, is the most satisfactory and aboveboard method of disposing of breeding stock. Here the breeder invites comparison, criticism and the critical testing of his stock by the men who are most directly interested. It is always helpful to a man to listen and talk to others who are engaged in the same business.

The practice of attending fairs and exhibitions is but another form of testing the fitness of individuals of one's herd to keep up the accepted ideals of type and breed. It offers the breeder a view of the highest standards in the light of which he may

judge and compare his own and guide his future course.

A HOG SHIPPING CRATE.

The accompanying sketch shows a strong shipping crate for hogs. It should be well built of pine or other light wood. For sheep a similar construction is good but $\frac{1}{2}$ " lumber is heavy enough. About 16" wide, $3\frac{1}{2}$ to 4" long and 30" to 36"



high are the right dimensions for a sheep crate. If it is to go a long journey wire in a small tin pail in one corner, so that the sheep can be watered. One can put a lot of green clover or grass in the crate at the beginning of the journey. Do not try to feed much grain nor to send a bag of it along unless a very dilute chop, mostly of bran, for a short period of starvation is better than feeding

by expressmen. A neatly-built crate, a shipping tag bearing the shipper's name and that of his farm will often aid in selling stock.

ADVERTISING.

Advertising is an important factor in the business of breeding pedigree stock. Men who conduct their business along proper lines generally are successful because they advertise. If a breeder advertises his surplus animals in high-class farm and stock journals intending purchasers have confidence in the man. Any breeder who has a surplus of good quality can well afford to advertise. In doing so he should make his advertisements telling and fairly modest. He should bear in mind that there are others in the business. Do not describe a type or an individual that cannot be delivered when ordered. Owners of animals of superior merit with established records should use facts about them in their advertisements. Many men would appreciate such data for guidance in selecting breeding stock. No breeder should expect to sell all his surplus stock by advertising; it is a rare occurrence in any line of business completely to close out an entire stock by any one method of sale. Success in advertising depends largely on promptness and judgment in answering correspondence. The advertiser who answers inquiries without delay, describes the animals desired, giving breeding, weights, ages, measurements and prices that are neither high nor low, generally sells more than the advertiser who brags and over-ex-

plains. When advertising brings a prospective buyer to your farm let him feel at once your friendly interest. Show him the herd and premises; respect his judgments about the hogs. In every sale the pedigree should accompany the individual or be sent immediately after the purchase price is paid. A journal in which it pays to advertise should have quality in all departments, and a reputation as an authority on live stock affairs. Its circulation should be among landowners. Stock cannot be sold to town people, and rarely to renters.

Public sales offer the opportunity and advantage of securing breeding stock of high individual merit at prices which buyers have the privilege of fixing. They are clearing houses for the disposal of surplus breeding stock under a method which is well established. Properly conducted they insure a just relationship between buyer and seller. They also develop men's business qualifications. Breeders should never offer any individuals with known defects without publicly stating them. Sellers should have as much interest as buyers in the future usefulness of the individuals that they offer. If this interest is shown it goes far to establish confidence.

Superior individuals often sell at prices seemingly exorbitant, while others, even more desirable, bring less. No system of selling accurately can measure a man's desire of possession. A safe guide in purchasing the high average character of an offering is to avoid extremes. Public sales carried out under the conditions suggested, being well adver-

tised and aboveboard in every particular, are the best means of transferring individuals from buyer to seller.

AUCTION SALES.

Auctioneer Z. S. Branson of Nebraska writes the following: "The public sale is firmly established. Let every man remember that when he places his offering in the sale ring he not merely offers the individual animal or piece of property but with it something of his own honor and judgment. And just in the proportion as these characters are good in the man will men see value in the offering, and be ready to pay for it. The business end of a public sale is not when the auctioneer mounts to block; this is the consummation. I consider the man the factor of greatest importance. If he have high character and high ideals his stock already is strongly recommended. The animal is an expression of the breeder's art. The second consideration is true individual merit. Look well to the catalogue. Sale animals should be in convenient places for inspection, in desirable condition and properly divided and identified. A carefully-prepared catalogue should be in the hands of attenders. Then the seller must have a conscientious, intelligent, discriminating, persevering auctioneer.

"A breeder can raise the standards of public sales by establishing a regular annual auction of the best of his surplus. There should be no reserve bids, arrangements or collusions. Everything should be left to a free and open competition among the

bidders. Breeders and buyers cannot afford to spend time and money only to be disappointed by the best having been sold before the sale at private treaty or be cut off from purchase or forced to compete against by-bid competition. No shy breeder, barren, deformed or unprofitable stock should enter the ring, unless a full statement concerning its defects is made publicly by the owner. All information should be positive and reliable. No breeder can afford to deceive customers intentionally by withholding information either at public or private sale. The future of the breeder who makes an ordinary or even a low average on strictly first-class stock is brighter than that of the man who sells plain, unreliable stock at an extravagant figure. Temporary success without merit is a failure. Temporary failure where both breeder and stock are of high character tend toward ultimate success. The more popular public sales become, the greater the necessity of confidence, harmony and fraternal affiliation among breeders. There is no danger so great in any business as disorganization, envy, jealousy and discord. The public sale system condenses business, brings money in bulk, cheapens expenses, widens reputation, brings many buyers together in a friendly social relation, extends acquaintances, places the seller on his mettle and teaches men to think rapidly that they may act wisely."

BREEDING PROBLEMS.

I have found that "like begets like" a safe principle in breeding. We can expect all litters strongly to resemble their sires and dams in type and markings. But inherent and acquired defects are expressed in diseased, undersized, hard-maturing, low-quality hogs, many of which will come in every herd. The breeder's highway is strewn with the wrecks of ignorant experimentation and mistakes of crossing breeds and types. Men who would attempt to depart from the practices of experienced breeders must look well to their own qualifications. I am of opinion that 25 per cent of the pigs in a pure-bred herd will conform quite closely to the general type of sire and dam; that is, in their genesis they will be practically independent of other ancestors. In breeding therefore there is probably not more than 25 per cent of the progeny that can be depended on as a basis of betterment; 25 per cent of heredity appears to work antagonistically, while the remaining 50 per cent may be classed as neutral. Upon the proper mating of individuals depends the aid of this passive blood in augmenting the percentage of superior individuals. A difference in individuality is always noticed in litters. There are never two pigs alike in conformation, one or more being of outstanding excellence and others of grada-

tory inferiority. In the main, a litter closely will resemble the blended type of the sire and dam, and more strongly the type of the parent that is of the greater intensified breeding with the greater stamina. The relative power of sire and dam to influence the conformation of their progeny depends largely on their own ancestors. In breeds with a long lineage I should say that together they exert 50 per cent, their ancestors controlling the remaining 50 per cent, diminishing in power with each removal of relationship. There is yet a negative influence, as shown by reversions, which can be corrected and strengthened by breeding. Such work may and often does destroy the usefulness of a type or a breed. To illustrate, in 1894 I bred a sow whose ancestry was known personally to me for almost 40 years to a boar bred in Ohio whose ancestry was known personally to its owner for perhaps a like period. The litter consisted of 10 pigs, nine of which were standard in color and conformation; while the tenth (a boar) was pure white. Being curious as to what the progeny might be, this was crossed on a sow of standard color; the resulting litter was mostly well-colored with a tendency to white. With these pigs I practiced inbreeding, securing an individual almost pure white in color. The experiment was here ended by marketing all hogs from the last cross.

Size, vigor, prolificacy and quality are often jeopardized for points of the fancy and by the too intense mating of close relations. Such breeding carried to an extreme (Nature never favors extremes) de-

feats the ends at which it aims. Breeders should study bloodlines and conformation and compare methods. Mate animals that have the essential parts well developed; breed those that are strong in essential points to those that are relatively weak in others. This is the way to effect improvement. But animals that possess the same points of weakness in common should not be mated together, as this would intensify the weaknesses in their progeny. Follow this line of breeding with limited inbreeding to intensify and fix type.

It is unwise indiscriminately to change from one distinct bloodline to another in selecting sires. I advise the gradual establishing of a type by using sires of a consistent similarity of form and largely of the same family bloodlines, with an occasional infusion of outside blood in sires that conform to the objective type. Follow this infusion with matings closely in line with the adopted ideal of standard.

Boars are generally more prepotent than sows, due largely to selection, care and feeding which increase vitality. Prepotency in pedigree hogs is much higher than in cross-breds. Age also exerts a strong influence on prepotency. A boar generally attains his highest breeding power during the full bloom of maturity, which is in his second and third years. This power can be conserved by intelligent use of the boar until well along in middle life, and in some instances to extreme old age. Many a breeding animal never reaches the natural limit of its

breeding power, owing to abuse and improper breeding. Many are weaklings when they should be in possession of their highest virility.

The short periods of gestation and lactation in hogs help to make them very prolific, making two litters a year possible under domesticated conditions. To secure the best results in breeding, the season of the year must be taken into account, as well as the condition and degree of maturity of sire and dam. The dam should be of the so-called "ideal brood sow" type, that is, highly developed in bone and muscle, and not be past her prime, well covered with flesh but not with fat, and fully up to the standard or beyond the standard of her breed in size. This kind of sow, mated to a boar of similar character—always bearing in mind that the boar must be at least fully the equal of the sow and if possible superior—and well fed during the breeding period and gestation, will produce the largest and strongest litters of pigs which will be comparatively easy to raise.

The general tendency of late years has been to breed animals that are quite immature in growth, age or size. This is a short-sighted policy which has done much to retard improvement and development of breeds by the creation of a type that is too small and too much inclined to run to fat, or that is low in fecundity. Naturally the constitutional stamina and vigor of the stock are lowered where this is practiced to any extent. The question of fecundity depends also on management, that is, on

care and feeding, but it certainly depends no more on management than on the proper selection of breeding animals. The age at which this necessary maturity is attained depends on the season in which the sow was farrowed as well as on her after-care. Spring gilts generally mature more quickly than fall gilts, and may be bred in time for them to farrow when they are a year old. Fall sows do not develop so rapidly, and they should not be bred before they have attained practically a year's age.

Boars, properly fed with developing feeds of a concentrated nature, reach safe breeding maturity at seven or eight months of age, although they do not attain full maturity for about two years. In their early breeding days, therefore, they should not be worked to excess, but should be looked after so that the progress of their development is never checked for a single day by the demands on their organisms. Only when this is strictly looked after will they be at their best and of the greatest real service when they do attain full maturity. If it has been looked after the effective breeding life of a boar may be extended to eight or 10 years before he becomes unprofitable or unreliable. Sows, too, may be by proper care and management kept in good breeding condition for many years, and useful brood sows should be kept for that purpose so long as they give satisfactory results or until the breeder has developed other breeding individuals whose type is more nearly an approximation to the ideal he wishes to achieve.

Climatic conditions and season affect farrowing and the development of pigs, and the breeder must take account of these factors in a number of ways. The wild hog produces but one litter a year, and does it in the most favorable season, spring. As the young produced in the spring have that season and the warm summer in which to develop, they harden and begin to mature during the fall, and so they are ready to face the rigors of winter when that unkindly season comes around. Man, however, has found that two litters can be produced annually under proper conditions. The sows are bred for a litter to be produced in the spring, and this may be called the "natural litter." It is weaned early enough, however, so that an early mating will give a fall litter which may be termed the "supplementary litter." Here, however, the conditions are not so favorable as in the spring, and so conditions should be made, by artificial means, as like those of spring as possible.

The months in which it is best to farrow depend on the purposes for which the pigs are being bred. The market demand is for heavier hogs during the winter packing season, while during summer the demand is for lighter animals which supply bacon and fresh meat. This summer demand, for "pig bacon," as it is known, is best suited with hogs of 150 to 200 pounds, and with hogs of from 200 to 275 pounds which cut up into a large percentage of lean meat. The winter season, on the other hand, requires heavier and fatter hogs whose meats, being

maturer and firmer, are considered of greater food value. To produce "pig bacon," therefore, farrowing should occur in January, February, and March, and these pigs will reach the market at an opportune time; while April and May litters may be carried along and matured into heavier pork during the winter or early spring.

BREEDERS' TERMS.

Hog breeding produces four general types. These, by the operations of line and inbreeding, close and outcross-breeding, develop all the types and breeds. A pure-bred hog is one whose sire and dam can trace a direct lineage, without a break or infusion of unknown blood, and all of whose ancestors have been bred pure for some years, until the prepotency of the line has become fixed and it always breeds true. Record associations have been formed to keep track of the lineage of pure breeds to aid in their propagation, and guarantee their purity. Animals eligible to record are called pure-breds, but pure-breds can and do exist outside the record. Line-breeding, inbreeding, close-breeding and cross-breeding are not practiced to any great extent except in the case of pure-bred animals.

Grades are the result of mating any two individuals that are not both pure-breds, either the boar or sow being pure-bred, and the other a grade, cross-bred or scrub. To attain best results in grading up a herd in blood and quality pure-bred sires should be used, so that their good qualities may be

introduced most rapidly into the herd. In carrying out further the grading up of a low-bred and low-quality herd a pure-bred sire should be used on the progeny of pure-bred sires. The pigs so bred may be called "high-grades." Such hogs, under the care of successful raisers, rank next to pure-breds, and often prove better, from a pork producing standpoint, than many inferior pure-breds.

Cross-breds come from mating individuals both of which are pure-bred but of different breeds. Many breeders think this method of breeding produces the best type of market hog, but after a lifetime of experience in handling hogs of all breeds, mixtures, types and conditions, there is no other plan against which I would more earnestly warn breeders and producers than that of cross-breeding. The breeder's course is set onward and never backward. Cross-breeding will not bring improvement of type, but will degrade the type with each cross. Often the pig of the first cross will prove to be exceptionally valuable as a pork animal, but the type can not be made to repeat, and so, if this kind of breeding is practiced at all, one cross should be the limit to the experiment, and all breeding sows retained from this cross should be bred back to high-grade as rapidly as possible, or sold. The continuing of cross-breeding and mating of individuals that are cross-breds or grades, without study or consideration of their blood, in breed or relationship, will result in the "scrub."

Many breeders believe that scrub hogs are those

which cannot be recorded in some record association and that pure-breds are simply hogs that can be so recorded. Scrubs, however, exist in almost all breeds. Pedigree hogs can be bred, through ignorance and careless matings coupled with bad care and feed, until they are pedigree scrubs. Scrubs will develop in grades and cross-breds through the same conditions. It may be said by way of definition, then, that individuals that are so low in prepotency, and of such type and quality that their mating produces individuals of still lower merit, are scrubs. It might be thought that wild or primitive hogs would be included in this category, but their power of prepotency is so highly developed that the wild species now existing must be credited with being nearer pure-bred than any domestic swine.

SURVIVAL OF THE FITTEST.

Probably every breeder is acquainted with the great law associated with the name of Charles Darwin, the law of the survival of the fittest. It is only too true, however, that some breeders proceed along lines that would not reveal their possession of this knowledge. In the natural state the weaker male is not generally permitted to reproduce, and if by any chance he succeeds in so doing he simply perpetuates his weak constitution to a line of progeny that emphasizes the weaknesses until natural selection does succeed in eliminating the line altogether.

This process should give the breeder a general

principle on which to conduct his own operations. In the selection of male and female for breeding purposes, symmetrical, strong-boned, well-muscled bodies, clear eyes, general aspect of vigor, graceful style and action, perfect carriage and control of movements should be sought. At the same time extreme characteristics should be looked upon with suspicion, for they may have possibilities of reversion or abnormality that would make the litters valueless for further breeding purposes.

LINE-BREEDING AND INBREEDING.

Stockmen often confuse line-breeding and inbreeding, and practice the one thinking it the other. Such practice is the most upsetting thing that can happen to their herds, and the knowledge that would prevent it is not in the possession of a large number of breeders. Inbreeding and line-breeding have been described respectively as "the mating of animals more or less related in bloodlines" and "the mating of animals that have little or no blood relationship." From this it will be seen that inbreeding is a specialized form of line-breeding. All breeds and types have been formed by as much preliminary line-breeding as was necessary in order to produce a desirable type, followed by such inbreeding as would fix and intensify its characteristics and make them prepotent in further reproduction.

The inbreeder should remember that "like begets like," and study carefully the relative vigor, size and quality of the animals mated. If they have

a preponderance of good points in common or if the weak points of one are opposed to strong points in the other the mating will be productive of good results. Breeding in this manner constantly corrects such faults as appear in the herd, the general characteristics to be produced are known in advance, and the uncertainties of selecting outside blood for sires every breeding season are removed. On the other hand, the inbreeder is not debarred from an occasional infusion of outside blood when the type represented by it is in conformity with the type which he is building up in his own herd. In this he may well follow the example of Bates and Cruickshank in cattle. He may also be warned by the imitators of these two famous breeders, who copied their methods but, not having access to the original herds, only succeeded in practicing a form of line-breeding that led to constant reversions and the loss of the distinctive merits which had been built up in the original herds. Beyond warning breeders against half-attempts at line-breeding when inbreeding is required, and against promiscuous in-and-out breeding, little more can be said in a general way. They must study their problems in detail and know the reason for every step taken.

CROSS-BREEDING.

It may be thought that, as there is not any certain breed or type exactly acceptable for the purpose of bacon or lard production, one can be created by a system of crossing distinct breeds and types. But

there is nothing more disastrous ultimately than this practice, even though it may appear profitable for one cross. Breeders and producers must understand that all breeds have long ago passed the formative period wherein the use of distinct outside blood was of benefit. The only course by which to secure improvement in the type of a breed now is by the selection and mating of the proper individuals of the same breed that show promise of building up a type like the ideal sought. The successful creation of new breeds, and of distinct types within breeds, is the work of "master breeders." The course of improvement in breeding is set, and it is always onward, upward and forward, and never backward. So all corrections, to be of the quickest and greatest benefit, must be made within the breed and by the breed, through judicious matings wherein stronger points will correct weaker ones.

The climate, feeds, local conditions and the time available for the care of the hogs must not be overlooked in the selection of stock, for all of these must be favorable for the best production of the type and breed. It is not best to select extreme types under any circumstances, and the great majority of producers have selected breeds of hogs that are really combination types. The breeds that often furnish individuals of this type are the Berkshire, Poland-China, Duroc-Jersey and Chester White.

DRESSING COMPARISONS.

In conclusion a summary of some packing house tests of the dressing records of leading breeds is

given for what it may be worth as an aid in selection. In percentage of dressed weights of meats they ranked as follows: Large Yorkshire, Poland-China, Tamworth, Chester White, Duroc-Jersey and Berkshire. There was, however, scarcely 2 per cent between the highest and the lowest. In weights of digestive organs they stood as follows: Duroc-Jersey, Tamworth, Berkshire, Chester White, Poland-China, and Large Yorkshire. In vital organs, as follows: Berkshire, Large Yorkshire, Tamworth, Poland-China, Duroc-Jersey and Chester White.

QUALITY AND SIZE OF BONE.

The structure and quality of bone are essential of a profitable hog. Large frames, big bones, strong feet and legs are indicatives of strong constitutions. Hogs of such build can avail themselves of all possible advantage in securing forage, and their free carriage of body aids digestion, promotes health and saves them many times from possible injury. We should feed as well as breed for bone. Size of frame or bone is not always indicative of strength, for size must have quality.

The leg bone should be round above the dew-claw and widening towards the body. The bone should be of close texture, hard and strong, and the legs should be without bends or crooks. The hog should stand firmly on the toes, without the dew-claws touching or the toes spreading apart. The foot bones must taper towards the foot. Flat,

coarse bones or broken-down feet generally indicate deficiency of strength. To measure the bone the tape should be drawn tight around the smallest circumference of the leg above the dew-claws. Yearling boars measuring 9" are passable, while 10" would be very good, and 11" a rare occurrence. Boars two years old and over may exceed these measurements about 1". The value of any excess of 12" is questionable, unless the quality of the bone is unusually good. Sows will measure from 8" to 9", and very rarely 10". Young boars and gilts at six months should measure $6\frac{3}{4}$ " to $7\frac{3}{4}$ ", and increase in size till maturity.

PROLIFICACY OF SOWS.

The naturally high prolificacy of swine is well known. When conditions are favorable for the sow and her litter troubles do not often arise. Proper feeds and intelligent breeding make it possible to increase fecundity. Closely-confined, under-exercised and highly-fed types show the error plainly by their record as producers. While such types may be ideal for packers they have proved failures as breeders' types, usually favoring their owners with twins. The ideal brood sow conformation is different in many points from that of an ideal packing hog. In the former there must be room for the full development of certain vital organs. To increase powers of prolificacy depends much upon the type, breed, care and feed. Should the record for prolificacy be good for several generations, then by proper care and feed it

can be increased, but if on the other hand the type or breed has degenerated in this respect it is best to secure from known sources breeding stock of marked fecundity. Many men weaken breeding powers in their herds by reckless overfeeding with corn. We can only expect to reap that which we sow. If the seeds of prolificacy are sown we may expect to reap large litters. Hogs require about 90 per cent or more of bone and muscle-forming feeds to 10 per cent of fat-formers to keep their breeding powers in good condition. Two farrowings should be figured on annually. It is not definitely known what influences the number of pigs in a litter, but most breeders attribute the variations largely to the condition of the sire and dam prior to or at the time of service and to the feed and care of the dam up to farrowing time. The full structure of the foetal litter is literally fed to the dam, and in fact all her feed for four to five months prior to farrowing should be constructive. By understanding this and applying their knowledge breeders have increased the breeding powers of their herds. But we must not overstep the bounds of nature, which seem to indicate in the sow's udder capacity the expected nursing of 8, 10 or 12 pigs.

The estimated annual increase of hogs is given as 500 per cent, while that of cattle, horses and sheep ranges from 30 to 100 per cent, and coupled with this increase is the rapid conversion of feedstuffs into pork products. A hog produces two pounds of meat from the same amount of grain from which a beef

animal produces only one pound. While the mare and the cow generally reproduce a single unit annually, the ewe two, the sow twice a year farrows litters averaging six to seven in number, which rapidly develop to combined weights many times greater than the producing units and oftentimes give reproductions of self at ages in the year of their own birth.

BARRENNESS IN BOARS AND SOWS.

There are many causes of barrenness in breeding animals. Extreme fatness caused by excessive feeding is perhaps the greatest. However, some are born barren. We must expect a varying percentage of low vitality and fecundity, which may eventually produce individuals that are barren. Sometimes deformities of the reproductive organs occur. Animals having such defects or tendencies to reproduce them should be fattened and sold. These organs also are injured by system-weakening scourges like cholera and fever, but in many cases they can be restored by proper feeding and care. After regaining strength if an animal fails to breed give 12 drops of fluid extract of Damiana daily for two or three days in milk or slop. Good pasturage and access to natural conditions are essential; corn feeding should be discontinued.

For the best results boars and brood sows should never be fattened to an extreme, sows especially, unless they are to farrow after the bloom of show quality and finish is reached. In the fattening of breeding animals feed relatively high in protein

should be used, and plenty of exercise given. Such animals really should not be fattened unless for show purposes, although they are often fattened for public sales. In all cases of fattening breeding animals plenty of exercise must be given to help diminish evil effects.

The practice of raising two litters annually, with proper precautions in mating healthy animals, and using care in feeding and management, will prevent or eliminate barrenness.

BREEDING SOWS.

Nature's unaided manner of mating is generally to be preferred to any other. The sow should be bred during the season of heat; all that is necessary is to give her the company of a boar. Breeding crates are useful in mating a boar and a sow markedly different in size or states of flesh. Such crates are often used in breeding extremely large or fat sires to gilts or small-sized sows. Used for this purpose, breeding crates are advisable, but some breeders use them to an extreme, as in forcing sows.

TYPES OF BREEDING CRATES.

The dimensions of the box (Fig. 1) are: Length, 5' 6", width 2' and height 3'. The length of the short box, which may be made by moving the end board *j* into the slot *k*, is 3' 6". The corner posts are 2" x 4" scantling and the sides 1" x 4" strips; *a a a* are joists for nailing the floor to; *b b* extra board to which the joists are nailed to stiffen the sides of the box; *c c*

are boar supporters which hold the boar's weight during service. The one on the left is stationary, while one on the right is adjustable to the size of the sow and should fit up tight against her side; d is a piece used to adjust the right-hand support; e is a pin which holds the support in place; f is a strip to hold d in the groove or mortise; the g's (of which there are six) are pieces that hold the supports solid and are 13" in length; h is a wooden screw to hold the front end of the adjustable support in place; i is a $\frac{7}{8}$ " rod which is placed behind the sow to keep her from backing out of the box; j is a movable end board which is used to adjust the box to different-length sows. When long sows are to be bred the board is placed in the end of the box, as shown in the diagram, and when the short sows are bred the board is removed and placed in the slotted board k. L L are cleats which hold the bottom end of the board j in place; m is a platform used to raise a small boar high enough to serve a large sow.

Fig. 2 shows another type. Instead of the adjustment for long and short sows being handled from the front of the crate the end is made stationary. Put in lower sideboards 10" high through which holes are bored at convenient intervals (C C C C) to admit the iron rod B, which should pass close under the hams of the sow just above the hocks. The proper hole to use is determined by the size of the sow. A crotch support A is added with a notch in it which passes between the sow's hind legs and rests on the retaining rod, as shown.

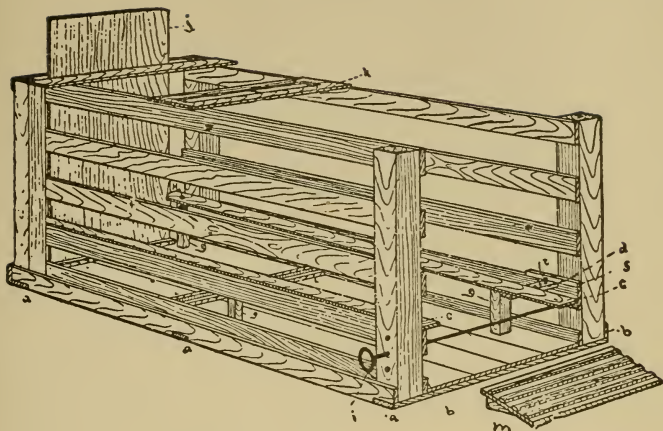


FIG. 1.

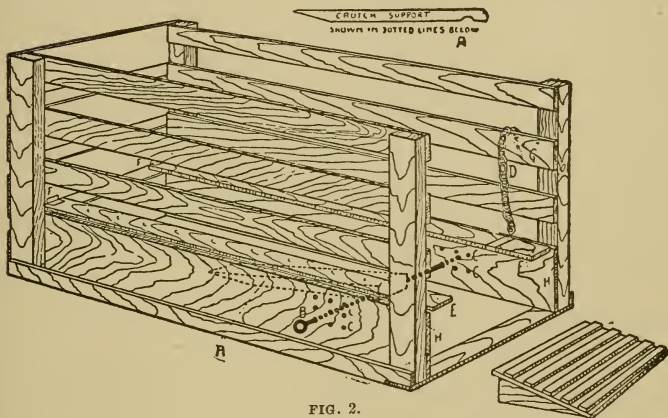


FIG. 2.

TYPES OF BREEDING CRATES.

This is 2"x4"x3' long, and the upper edges are rounded off smooth, so as not to injure the sow. The side supports for the boar E are made adjustable by hinging to one of the cross slats in front and are raised or lowered from the back by means

of a chain (O) which passes over the top of the side board, and fastens to a pin or heavy nail G. Put a chain on for each support. Two 4" boards, 6" apart, should be nailed over the top of the crate above where the sow's head comes to prevent her from climbing out.

THE QUESTION OF TYPE.

Although I have worked with one breed so long that I might be expected to be prejudiced in its favor, I have attempted to lay aside all prejudice in the following remarks on the special qualifications of the different breeds. The first qualification of any hog, irrespective of breed, type, or color, is its pork-producing ability. Next comes adaptability to climatic and other conditions of the raiser's locality. The individuality and condition of the hog selected must also be taken into account. Then, there is required the ability by the pork-producer to keep his hogs in high condition so that they may bring the largest returns, for no matter how highly-bred any hogs may be or what their achievements in the show-yard were, bad care and management, and unfavorable surroundings, will cause a reversion of type. Yet men who understand not only breeding but the best methods of feeding and care can force individuals of low merit and low breeding to produce better returns than can careless men with the best of breeding and individuals. This fact often accounts for the reputed failures of pure-bred swine to make good as pork-producers, and for the false assertion by many that grades or cross-breds give better results than do pure-breds. The fact is,

however, that there is no grade or out-crossed hog that can be made to accomplish the profitable results that selected pure-bred individuals will, if fed and cared for by a successful pork-producer. The weights and winnings of pure-breds at State Fairs and Fat Stock Shows attest of their supremacy.

THE BACON TYPE.

In many ways the bacon type is like the lard hog, but has a more rangy build, with a larger development of sides, which makes it produce more lean meat than the fatter type. The United States has not heretofore developed this sort so commonly as Denmark, Great Britain and Canada have done, as our market has demanded a type that combined lard and bacon possibilities. An ideal bacon type may be described as follows: In stature, long and rangy; standing on long legs that give an appearance of great height to the hog; great depth of body with a good length of side; a ham developed mostly at the top, with a long rump connecting with a back strong and arched but smooth and even; shoulders smooth and even without superficial development of the sides or coatings of fat at the bottom parts; a neck of fair length, smooth but not thick, tapering to the head, which should be clean-cut with a very light jowl, with scarcely any curvature; underline straight and well down to provide capacity for vital organs, and for a long and wide side of meat in proportion to the body of the hog.

The weight of the bacon hog is from 175 to 225 pounds, although some packers use lighter weights,

which are termed "pig bacon." This is not done, however, with weights much below 150 pounds, as such pigs are too young to be depended on for bacon of the highest quality, firmness, and flavor. But hogs of nearly all weights heavier than the ideal are used for bacon cuts, if they have the bacon parts strongly developed. Generally hogs weighing 250 pounds and over have too much fat with the lean in their bacon parts to be termed, strictly speaking, bacon hogs. Of course the standard bacon types are better adapted to furnish bacon at a wider range of weights and ages than hogs of the fat or lard-type which have to be fed and developed almost especially for this purpose, and marketed at a certain age and weight. The leading breeds of this type are the Tamworth and the Large Yorkshire, which is perhaps best of all, and the medium Yorkshire. While the Hampshire and Cheshire are often classed as a bacon type, they are more of a dual type.

THE QUESTION OF SIZE.

The size of a hog is regulated within certain limits by its breed and the conditions under which it was bred, and the actual development of size depends on the purpose for which the animal is being fed. The questions of size and maturity go together. Full maturity should not be reached at too early an age nor with too small a stature. It should, however, come fairly rapidly, and the hog should not be four or five years in attaining it. The hog should be capable of growing in bone and body, as well as merely in size through increase of fat, when devel-

oping feeds are given, until it weighs from 800 to 1,000 pounds at full maturity. But it should also be able to arrive at maturity, from a pork standpoint, at any age over six or eight months, in response to a finishing process of feeding. Breeding animals should be larger than their pork-fellows, for such animals should be mature, and they should not be fed finishing but developing rations. For brood sows 300 or 400 pounds is considered a good average weight. From 400 to 700 pounds are considered mature weights, but over that the breeding value of a sow is doubtful, unless she is highly developed and known by record to be a reliable breeder, careful mother and suckler.

The weight of hogs intended for pork has to be looked at from another standpoint: the cost of feeding them in relation to the number of pounds of pork the feeding will eventually produce. As this cost will vary in relation to age, size and approach to maturity, all these things must be taken into account. Pigs fed continuously from birth to maturity often become unprofitable if the finishing process is prolonged, and for this reason they are marketed in pig form at 150 to 200 pounds. On the other hand, pigs carried on more or less of a developing ration may be induced to mature at a later age, when they weigh 175 to 225 pounds. Then, pigs fed what may be called a special developing ration, and given a short finishing feed, will weigh from 200 to 275 pounds with good pork-maturity, quality and finish, and at a lower cost per pound.

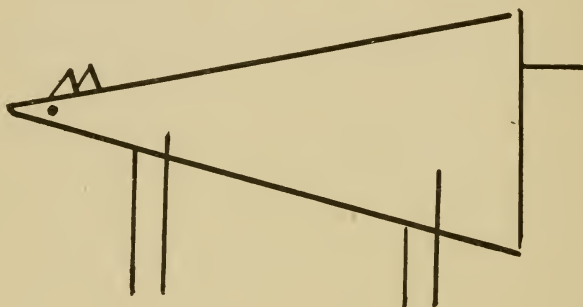
The principle of this difference is simply that finishing feeds cost more than developing feeds; that hogs fed continuously on highly nutritious finishing feeds do not make the same percentage of gain when close to full maturity as they would do before the beginning of maturity was reached. To keep the cost of production down, therefore, it is necessary to breed from stock of large size and at full maturity which will transmit the ability to mature at 200 to 300 pounds. The selection of such breeding animals of course requires good judgment backed up by practical experience in detecting the presence or indications of the necessary characteristics. Apart from this aspect of the matter, however, a large part of the power to control weight and usefulness resides not in breeding but in scientific care and feeding after the hogs are bred.

THE PACKER'S TYPE.

The butcher and packer look at a hog from a money-making standpoint, and care nothing for pedigree and breed except in so far as they produce a type which has a definite value in dollars and cents. Packers, like breeders, however, are not unanimous in defining the characteristics of such a type. But the majority of them agree that the high-priced meats are carried high, relative to the whole carcass, and of course the animals carrying the largest proportions of these meats are the most profitable cutters. They want as little waste in the hog as possible, and so the smaller percentage of the total

weight represented by the jowl and head the better from their point of view. One packer in describing his ideal to the author made a diagram like that below, explaining it by saying that he wanted a preponderance of back and side meats, with a good ham, which is not, however, overdeveloped at the lower end.

While such a shape would certainly give a high percentage of high-priced meats, it would leave but little room for the vital organs and would be con-



trary to accepted breeding types. Up to the present we have not been able to furnish an ideal packing type, such as the one illustrated, and at the same time retain the necessary breeding qualifications. While hogs of different weights are in demand, according to the season, the combination type is in demand all the time, for it carries the greatest compatible proportions of such products as lard, bacon and ham, which are needed all the year round. But at the same time the seasonal demand, now for a lard hog, and again for a bacon hog, will sometimes

exceed the supply, and cause those types to bring better prices than the combination type. These fluctuations make impracticable the outlining of a definite type to be bred for the packer. The needs of the packer themselves depend on the demands of the public, and these demands vary with the season and with other factors.

It is possible, however, to give a rough approximation of a good breeding animal of the packer's type: Head, rather small, but in proportion to body, broad in face and between eyes, tapering to the nose; ears and nose, medium; jowl, clean-cut and not baggy; neck, short, wide and full; shoulders; wide, smooth, with most meat on top but not overdeveloped; chest and width between forelegs, full and very wide, showing plenty of capacity for the vital organs; heart-girth, equal in circumference to loin circumference or length, or a little over this, which is only an approximate proportion; top line, even, without holes or lumps; rib line, even from middle of shoulder to middle of ham, showing well-sprung ribs and a smooth, wide, even back; sides, full and deep, almost straight from the rib-line, rounding slightly in to the bottom line, which should be almost level with the exception of a medium cut-in of the flank.

In the development of such a type as this the points to be strengthened are the loins, tops of hams and top cuts of bacon, as these are the price-bringing parts. The development may also be pushed in the direction of wideness through the back end, tapering

to the shoulders. But apart from these, other extremes of conformation should be avoided. To carry this conformation to advantage strong legs and a firm bone structure are required. Not only must the hog be able to stand transportation without injury but it must be able to stand development and finishing treatment, and be constitutionally strong. These considerations have much to do with the effective weight of the hog from the standpoint of profit in that weight. The weight of a hog is not a matter of so many pounds, as is sometimes supposed, but a matter of the quality of the pounds, that is to say, of the percentage of high-quality meat in the finished carcass. While quality and finish may be seen in the condition of the animal, and in other indications when alive, the final test is made by the packer and the consumer.

It is important to bear in mind that the packer's demands can never be satisfied altogether without ruining the breeding possibilities of hogs, and that the breeding of a good compromise animal is a slow matter, the undue forcing of which will result in degeneration. The consensus of opinion among the packinghouse buyers of the best practicable type of hog for their general purposes favors the Poland-China and the Berkshire, with first crosses of Poland-China boars on Duroc-Jersey sows a close second. They say that all these breeds produce "a hog of generally good form, with good back and leaning strongly to weight in the hind-quarter."

From their observations of animals slaughtered

and inquiry into their feeding, the packers agree that a mixed ration of such materials as corn, barley, wheat, oats, alfalfa and clover should be given until four or five weeks before marketing, followed by a full feed of corn for hard fattening and fleshing with very little pasturage. Milk and slops should also be used, as they produce the finest possible meats. These feeds may be used in almost any combination, but the actual finishing should be almost entirely with corn.

It will be seen that the development of hogs for general packing purposes must be guided very largely by the question of utility in the packing-house. The hograiser will be helped very much in his efforts by knowing just what that means. Such knowledge will enable him to use his initiative to advantage in working out his practical problems.

A COMBINATION TYPE.

Taking it for granted that the law of the survival of the fittest has created and lent stability to the four or five leading breeds of today, a combination of conformation is given in which the good points and their objections are contrasted. This may be considered as the ideal for a breeding, feeding and market type that leans more to a lard form than it does to bacon. The same type, however, may be developed to a strong bacon-producing tendency. A detailed description follows:

HEAD—Medium, broad, slightly short, tapering evenly to end of nose; surface, even and smooth.

Objections: Long or narrow between eyes; too coarse or uneven, too short or snub-nosed.

EYES—Full, expressive, prominent, clear, free from surrounding wrinkles. *Objections:* Dull, deep-set, impaired, weak, or too small, or too narrow between.

EARS—Medium size and thickness, attached to head with short, firm knuckle, free and easy action, fully controlled by animal. *Objections:* Too large, coarse, floppy, drooping, big-knuckled, thick or too small, fancy and unproportioned in size, or contrary to breed.

NECK—Full, wide, medium short, even, well-arched, rounding with due regard to sex. *Objections:* Long, thin, flat, shallow, drooping, uneven, wrinkled or creased.

JOWL—Medium to full, broad, smooth, firm, carrying fullness well back to shoulder and brisket. *Objections:* Too large, loose, flabby, wrinkled, small or thin, not carrying fullness back to connecting points.

SHOULDERS—Broad, oval on top, even with back line and neck, carrying good evenness of width from rib-line to line of belly. *Objections:* Narrow at either top or bottom, creased or of uneven width or depth, of disproportionate sizes; excessive shields or over-development of lower parts.

CHEST—Large, capacity of good width, depth and fullness, showing an even underline, and giving plenty of room for heart and other vital organs; showing a large girth and even, smooth, and broad

brisket, with good width between legs. *Objections:* Narrowness at top or bottom, lack of depth or fullness, tucked up behind or between fore legs, small heart girth or narrowness between fore legs.

BACK AND LOIN—Straight or slightly-arched, with good breadth, carrying same width from shoulder to ham; smooth, even surface, free from lumps or creases; showing well-sprung ribs that fill to a straight edge from point of shoulder to point of ham, shorter than lower belly line, but permissibly a trifle higher at loin than at shoulder. *Objections:* Narrow, shed-roofed, sway-backed, creased, wrinkled or humped; loin too high, narrow or depressed, or uneven in width or fullness, not connecting evenly with other parts.

SIDES AND RIBS—Full, smooth, of good depth and length, firm and free from wrinkles, carrying size down to belly line; ribs well-sprung and of good length, being in line with shoulder and ham, giving the hog a slightly-rounded square form and of carrying a high percent of loin, ham and bacon. *Objections:* Flat, flabby, thin, pinched, tucked up, uneven or creased surface; ribs too short, weak or flat, lack of rounded spring at top or bottom, lack of length or width, not in alignment of points of shoulder and ham.

BELLY AND FLANK—Belly fine, straight, full and broad, level at flank with underline to chest, same width as back, having ample room for vital organs. *Objections:* Belly line uneven, narrow or sagging, flabby, pinched, or tucked up; flank too high.

HAMS AND RUMP—Hams, full, long and deep, with good width, extending well down to hock, fully developed above, very wide at point of hip, carrying width well down to lower part, tapering toward the hock, being rounding and plump in appearance, symmetrical with other connecting points; rump, rounding and sloping gradually from loin to root of tail, same width as ham, back, loin and body, well developed, and filled out around tail. Brood sows should be of greater width through the hams than shoulders. *Objections*: Ham too short, narrow, round, slim, undeveloped, unshapely or cat-hammed, lacking width, or cut up too high; rump too narrow, not filled, or too steep, sharp or too peaked, uneven with connecting points.

FEET AND LEGS—Medium in length, straight, set wide apart, and squarely under body, tapering down to hoof, of good size and well-muscled above knee, round and tapering below; bone of fine texture, firm and round below, with short pasterns, set nearly upright; short, tough, firm feet free from defects, standing well up on toes. *Objections*: Legs too long, slim, coarse or crooked or knock-kneed; bones too coarse or not tapering from top to foot; light-muscled, long, weak or crooked pasterns, legs set too close together; hocks out of line, hoofs too long or weak, crooked, spraddling or spreading, broken down, or turned up.

TAIL—Of medium length and thickness, tapering to bush, well set on, carried with style, smooth, hav-

ing medium bush at end. *Objections:* Coarse or too long, small or too fine, short, crooked or stubby, ropy, uncurled or too bushy.

COAT—Fine, straight, smooth, close-lying, and body-covering; evenly distributed excepting belly. *Objections:* Hair too coarse, bristly, harsh, rough, dead-like, wavy or curly with swirls, standing up; not evenly distributed, or too fine, or insufficient in quantity.

COLOR—Either solid black, cherry red, or white, or black with six white points, with occasional spots or splashes over body, according to breed. *Objections:* Spotted, sandy, or speckled with different-colored hairs over body, or spots of different-colored skin or hair in solid-colored hogs.

SIZE—Large for age and condition, quality accompanying, with a difference of 25 per cent allowed between breeding and show animals. Two-year-old show boars should not weigh less than 700 up to 1,000; two-year-old show sows, from 600 to 800; yearling boars, 550 to 700; yearling sows, 450 to 600; boars 18 months old, 600 to 800; 18-months sows, 500 to 700; under 1 year boars and sows, 400 to 500; boars and sows six months old, not less than 160 up to 240 pounds. *Objections:* Over-grown, too coarse, flabby, angular, hard-maturing, too fine, under-sized, too short, stubby or chubby, too small in maturing; other than robust animals.

ACTION AND STYLE—Action, vigorous, easy, graceful; style, attractive with high carriage. *Ob-*

jections: Sluggish, awkward, waddling, lazy, not erect; or low carriage.

CONDITION—Healthy, free from scurf, sores or scales, soft and mellow to touch, flesh evenly laid on, free from lumps and wrinkles and of fine texture; hair lying close to body; good feeding qualities.

Objections: Unhealthy, wrinkled, scabby skins; flabby, creased, or lumpy-fleshed, too fat for breeding; poor feeders, serious physical defects; hair, harsh or showing bad condition.

DISPOSITION—Responsive to good treatment, quiet but naturally good exercisers. *Objections*: Wild, cross, vicious, restless, too sluggish, stubborn or too dependent.

DISQUALIFICATIONS.

FORM—Too large, too coarse or too small, narrowness between eyes, drooping ears that impair sight or extremely small or fine or upright ears indicating too small maturity; cramped chest capacity, weak or sway back, deformed or crooked legs, too soft or spongy bones, broken-down feet, deep creases back of the shoulder on back or on sides, serious deformities or defects in any part of the body.

SIZE—Over-grown, gangly, loosely-connected, narrow, shed-roofed, too small, too short; body, sides or back, maturing at not over two-thirds of minimum size for age, or at too advanced an age.

CONDITION—Excessive fat, gobby, barren, deformed, diseased, blind, or evidently of hard, slow maturity.

SCORE—Less than 70 points.

PEDIGREE—Ineligible to record, or, if not of pure lineage, until prepotency has been firmly established.

COLOR—Radically different from that of ideal or having tendency to breed intermittently.

THE LARD TYPE.

Hogs are produced mainly for meat and lard. The types that produce the greatest quantity and the highest quality of these products give the highest-selling hogs on the market, and they are most in demand. So whatever breed we may select we should be influenced by the market demand, which is twofold, on the one hand requiring animals producing plenty of fat—the lard hog—and on the other requiring the bacon type. Which of these two one should raise depends upon one's location and the conditions it imposes. The fat or lard type is also known as the packer's or butcher's or farmer's type. One of its essentials is a good frame, especially fitted to carry an abundance of high-priced meat and fat. The animal should be equipped with a perfectly-working digestive and assimilative apparatus in order to secure and properly distribute the materials that build flesh and fat. Every other feature of its conformation should be in line with these factors in order to insure strong constitutions and easy-feeding qualities. There should be no over-development of such parts as the

jowl, head or shoulders, which, when over-developed, check the growth of other vital parts. But there should be strong development in the hams, sides, loin and back, with an extra thickness of flesh evenly distributed and covered smoothly with an abundance of fat. In stature the hog should be medium or large, of good length, breadth and depth, and possess symmetry. Breeds which produce this type are the Poland-China, Berkshire, Duroc-Jersey, Chester White and Essex. Hampshires and Cheshires may be regarded as compromises between the lard and bacon types.

THE BREEDER'S TYPE.

What I term a breeder's type represents the highest ideal for any breed. We should use in our herds individuals that possess great scale and are of high show quality, when properly developed for their respective classes. We should use mature sires and mature dams in producing breeding animals to sell. A breeder should know positively the individual merit of his animals before they are offered for sale, thus testing the seed before guaranteeing and disposing of it. Pigs from immature gilts and experimental matings are often a handicap to purchasers. Breeders should cull their annual pig crops very closely, so that all individuals offered for sale or returned in the breeding herd shall be of high average excellence. To give assistance in selecting and judging a breeding type the following standard of excellence is outlined, being

applicable to the Poland-China, Berkshire, Duroc-Jersey and Chester White breeds:

SIZE. —Large for age, quality combined with size; weight of boars: Two-year-olds, 600 to 1,000; 18 months, 500 to 700; yearlings, 400 to 550; under one year at breeding time, not less than 200; sows under one year, not less than 200 at breeding time; yearlings, 250 to 450; 18 months, 300 to 550; two-year-olds, 350 to 700 pounds.....	8
BACK AND LOIN. —Broad, slightly-arched, with even width from shoulder to ham, of good length, without depressions, ribs well sprung, loin well developed.....	10
SIDES AND RIBS. —Sides deep, even and smooth, with good length, and of even width, free from wrinkles; ribs well sprung both top and bottom, of good length, giving the hog rounded, square-like form and indicative of good capacity	9
HAMS AND RUMP. —Ham broad, full, deep, of good length and width, extending well down, fully developed, wider at point of hip in sows, carrying width well down and tapering toward hock; symmetrical with connecting points, the rump rounding and sloping gradually from loin to root of tail; brood animals should be better developed in the ham, rump and back than shoulder.....	10
CHEST. —Large, wide, deep with a full even underline, no creases, good capacity for heart and other organs, wide between legs	10
FEET AND LEGS. —Medium length and good size, straight, tapering from top to hoof, set wide apart, squarely under body, well-muscled above knee; bone of firm texture and of round shape below knee, pastern short, nearly upright, with short tough firm feet, free from defects, standing up on toes	8
CONDITION. —Healthy, free of creases, lumps or excessive fat, in good flesh, but not poor.....	6
DISPOSITION. —Quiet and easily handled.....	2
SHOULDERS. —Fairly broad, rather oval on top, even with back and neck, not wider than hams in sows, but in conformity with sides, back and ham.....	5
ACTION AND STYLE. —Attractive, easy and graceful carriage; boars vigorous	5
QUALITY. —Fitness for purpose, general high character of all points and parts as a breeder and a producer of animals of desired pork type.....	6
HEAD. —Broad between the eyes, tapering to end of nose; head medium in size, rather long without extremes either way.	3
EYES. —Full, expressive, clear and unimpaired.....	2
EARS. —Of medium size, firmly attached, of rather thin and lean shape, controlled by animal.....	2
NECK. —Medium long, of good depth, slightly rounding and arched, even and smooth without wrinkles in sows; boars should show more fullness.....	2
BELLY AND FLANK. —Belly broad, straight and full, showing good capacity, of even width, not flabby or sagging, having straight underline with flank well let down.....	5
JOWL. —Fairly full, smooth and firm but not over-developed...	2
COAT. —Fine, straight and smooth, evenly distributed.....	1
COLOR. —Ideal of breed	1

TAIL.—Medium length and size, tapering, carried with some style	1
SYMMETRY.—The similarity and regularity in shape of all parts of both sides of the body that go to blend the animal into a model type, each side being an exact counterpart of the other	4

 100

THE FARMER'S TYPE.

I have always advocated keeping the type of my breed in line with the farmers' requirements, and have realized that no matter how good an individual I may develop, how great its achievements in the showring or how great a valuation might be assigned it, there was a farmer somewhere who could use that individual in his own herd, and that this individual was none too good for him to use. The business of breeders is to produce the best seed from recorded lineage for the farmers to use in improving their herds. Whenever a breeder thinks that his breed or type is too good for a farmer to use he is destroying its usefulness. If it was not for the farmer's demands for breeding stock, we should soon have no distinct types or breeds, record associations or breeders. The farmer's hog should be the best that any breed or type can furnish. Its strong points should be maturing and feeding qualities, constitution, activity with free carriage of body, adapted to forage for feed, prolific and quiet in disposition during pregnancy and motherhood. Market demand and the feeds produced on the farm largely dictate the type, but the great majority of farmers prefer the large, long, deep type, with a large percentage of high-priced meats. More farmers are feeding

balanced rations than ever before, and are endeavoring to produce better grades of pork at more economical costs. The type of hog they need is not common in any breed, as only the best can qualify.

EARLY MATURITY.

The type of hog that matures in frame too young and too quickly is not the most profitable for feeders and farmers, for when it has reached this point, which is often at 200 pounds, it cannot respond to feeding, as the limit of capacity has been reached. The type to bring about the cheaper production of pork, and to meet all conditions that may arise, is the hog of great capacity, capable of responding profitably to feeds for a long period. It is a hog that will not mature or quit growing at too early an age or too small a size. Such hogs will also finish easily and quickly at any period after five months of age, with the proper feeding.

This does not mean an extreme slow-maturing hog that possesses great size, bone, length and height, whose conformation is irregular, being shed-roofed, cat-hammed, sway-backed, elephant-eared, rat-faced, triple-chinned or jowled, with Clydesdale legs and feet.

The ideals set up in the foregoing chapters on types are the ones to choose and adhere to for success, pleasure and profit.

FEEDS AND FEEDING.

The first thing to remember in feeding hogs is that the rations must be so balanced as to fulfill all the requirements of growth and expenditure of energy by the hog, while they also contain enough bulk and moisture to make thorough elimination possible. The most important constituent of the ration is protein, and it has been estimated that 12-100 of a pound of digestible protein is required daily for every 100 pounds of the hog's weight. This theoretical requirement should always be exceeded to a slight extent, however, as there is a constant factor of waste due to the fact that digestion of protein is never quite complete. On this basis the pig would require, in practice, from 3-5 of a pound of protein up to 4-5 of a pound until three or four months old, after which the amount should be around 3-5 of a pound, varied according to the purposes of feeding. The next essential constituents in the feed are the carbohydrates, and the amount needed of these increases with the growth of the pig. It is claimed that $\frac{1}{2}$ of a pound daily of carbohydrates per cwt. of pig is required for its maintenance alone, and an additional 1-5 of a pound per cwt. per day for growth and waste due to imperfect digestion. The latter proportion should be increased to 3-10 of a pound when the pig is seven or eight months old,

and may then be regulated according to the purpose of feeding. The more the hog must rustle for his feed the greater proportion of carbohydrates will be required, as they have to supply the energy needed when any muscular effort is made.

An important point in feeding is that the hog should have free access to charcoal, lime, wood ashes, salt or bonemeal, which supply needed cleansing substances and the mineral constituents of bone and muscle.

It is of the greatest importance that the hog be given plenty of pure water. From 10 to 12 pounds is needed daily for every 100 pounds of pig when it is first weaned, but the amount drops as the pig grows until at maturity only one-third that amount will be required. In summer, much of the water may be given with the feed, forming slop, but in winter, dry feeding and free access to pure drinking water give the better results.

The effects of feeding will be enhanced by giving a proper amount of exercise. Pigs confined to small pens will not eat as much as will freely-running animals, and their digestion will not be so good as if they were allowed to forage for some of their feed. Confinement to pens is only justified when finishing for fat. Continually practiced, it will not only hurt the individuals, but the breed will be affected. Exercise, on the other hand, stimulates digestion and directly increases growth and the capacity to fatten up to the greatest extent. The smaller types of pigs and hogs to be retained for breeding

purposes need more exercise than do the larger-framed animals and those on a finishing ration. The distinction, however, is not an important one, as all kinds of hogs may be given a free range and each type will naturally take sufficient exercise to secure its own best condition.

Feeding, in its results, may run to two extremes: excess of fat or excess of lean. As the greatest pork demand is for table consumption, the feeder should avoid both extremes, and try to attain both lean and fat in proper proportions. The consumer's ideal is a product rich in lean but carrying sufficient fat for its own cooking as well as a good remainder for consumption. In feeding for this end the attention should first of all be directed to the attainment of a sufficient basis of lean meat, for this can be produced more cheaply than the fat. That, being relatively expensive, should be left until the finishing process, and should be piled up in as short a time as possible, if it is to be done economically. The relative expense of the two kinds of feeding will be seen if the dress of a well-finished hog of 225 or 250 pounds is roughly analyzed. The dress will vary from 74 to 82 per cent of the gross weight; this will figure 18 to 26 per cent offal. The average lard yield of such a hog is 12 per cent of the live weight, the bones are 20 per cent and the remainder, less 10 per cent for inferior and inedible parts, or about 58 per cent of the gross weight, will be lean meat. Assuming the cost of production to be \$5 per cwt. for the gross weight, and dividing the loss from

waste and offal between fat and lean, it will be seen that the cost of production for the pound of fat is much more than for the pound of lean. It is, therefore, quite unprofitable to feed for fat at any other than the finishing stage. But when the fat-feeding is done rapidly after the hog has reached maturity of frame, the cost of increasing the weight is lowered and the animal may often profitably be carried up to 300 pounds.

In all the operations of feeding and care, the natural disposition of hogs should be kept in mind. Not only should water, feed and shade be given, but quietness should be secured, and hogs on no account handled, harassed or driven around more than is absolutely necessary. Many useful hints for their management may be gleaned from an attentive study of the hogs' dispositions. An example of the kind of observation here referred to is the utilization of the natural greed of hogs, when they are inclined to fall off in appetite. If a few lean and hungry pigs be turned in with a hog that is slightly off feed the change in its attitude toward the feeding trough is remarkable.

Feeding should always be frequent and at regular intervals. Plenty of drinking water should be provided, and the hog may be trusted to resort to it before and during meals as often as is necessary for the best results in digestion. Large feeds of slop, or dry feeds, followed by deluges of water, on the other hand, will only serve to derange digestion. With the main feedstuffs, a few dainties and appetizers

should be added, as the hog is likely to lose appetite if too heavy a diet is given without intermission.

It is best to always gradually build the ration up in variety and richness, finally ending with mostly corn when fattening for market. It is harmful to build the ration down or to radically change its nature or amounts.

Cleanliness is essential. Feeding floors, troughs, yards and sleeping quarters should be frequently disinfected, and yards changed to a new location at least every 10 years. This will reduce danger of many infectious diseases, Hog Cholera, Lice, Worms and Enteritis especially. Cobs, trash and accumulations should be raked into piles and burned into charcoal every few weeks. Feed should not be left over and allowed to accumulate in feeding troughs. Swill barrels and pails should be kept clean. When slop is made and left in barrels a handful of soda to a barrel of slop will be found a useful preservative. Into barrels containing soaked corn a handful of salt or a small amount of concentrated lye should be placed, making it more palatable.

Pigs should be fed in bunches of not more than 15, and they should be graded according to their feeding capacities. Those which do not develop at the same rate as the bunch should be separated and graded off with pigs of their own class.

A SHORT SUMMARY OF HOG FOODS.

Feeds relatively high in protein are conducive to the best results. These are obtained largely from

forage crops, like alfalfa and clover or milk, supplemented with grains comparatively low in fat. To produce meat and fat use corn, wheat, rye, barley, oats, peas, beans, alfalfa, forage and pasture, in combinations to make balanced rations. The tendency in recent years has been to produce finished hogs of extreme fatness, regardless of the fact that home consumption calls for a meat type. Corn is the basic hog feed and is the most economical feed for fattening. In breeding herds evil effects always attend its excessive use. Wheat and its products—shorts, middlings and bran—are generally fed in connection with corn and pasturage. Bran is highly valuable for brood sows during pregnancy. Barley and rye, somewhat similar to wheat in composition, should be fed ground into a mixture of other feeds, and soaked for a few hours. Rye is not recommended for brood sows. Oats, a cooling laxative, is one of the best cereals for brood sows and growing pigs. Oatmeal is used largely for growing and fattening pigs and by many breeders in finishing show animals. Peas and beans are used mostly as forage crops, although they are often ground into meal and made the nitrogenous parts of rations, being generally mixed into a slop of moderate thickness. This method of feeding produces the best results in the summer, while in the winter it is better to use these materials in a dry state. Feeds should never be soured, neither should they be soaked for a period longer than 24 hours.

Alfalfa and clover are staple forage and hay

crops. Grazing is practiced in spring, summer and fall, and in the winter cured hay is fed whole or chopped and ground into meal. For prompt and economical returns the open pasture and grazing system, with weather conditions especially favorable to pork production, is the most profitable. Where alfalfa and clover cannot be successfully produced, such crops as rape, peas, beans, sorghum, millet and oats may be employed with good results. It is essential that hogs should have access to forage and pasture, whether they are in the developing or fattening period. Milk is the best-balanced food for man or beast. It is almost indispensable in developing pigs for the highest usefulness as breeders. This is why I urge hogmen to keep dairy cows. Cream and butter command good prices, and skim milk is a pig feed par excellence. While there are many feeds manufactured for hog feeding, and their use is profitable under special conditions, home-grown products should be used practically exclusively. Hogs, like men, relish variety and change in their diet. Cottonseed-meal has a limit of about 40 days and a full-corn ration will wear out its welcome within 60 days. No matter what feed is given as a whole ration, hogs will tire of it and begin to make gains expensive. This is why many feeders find it unprofitable to feed hogs after they weigh 250 pounds; the last 100 pounds cost too much. The secret of cheap production is first to grow strong frames on diversified grain and forage crops, always keeping the hogs keen in appetite, then giving them a short high

finishing feed to which they will respond. In this way the ultimate cost of producing 300 pounds of finished pork will be perhaps one-third or one-half less than in the case of the continuously grain-fed hog. Besides, the time required will be shorter.

OVERFEEDING AND UNDERFEEDING.

From personal experience I am inclined to blame overfeeding and underfeeding for many of the failures in hograising, and for many of the ills of hogs generally ascribed to other causes. Of the two, underfeeding is the lesser evil, if not carried to its logical extreme. The underfed hog may be built up in appetite and capacity to an evenly-balanced, correctly-gauged ration and will show but little traces of its previous underfeeding; but it is a much more difficult matter to bring the overfed hog back to a normal ration without, in the process, bringing to light many bad effects of its previous gorging. The whole question of success in feeding depends on giving the pigs a proper start and then feeding them consistently. The raiser who overfeeds one day and underfeeds the next will produce an ill-assorted bunch of hogs, most of them very apparently the worse for such treatment. It should be remembered that while some hogs have inherent powers of responding uniformly and satisfactorily to feeding that is neither uniform nor satisfactory, the majority have not, and require careful judgment in their feeding if they are to show any profit from it.

Overfeeding establishes many digestive disorders and is perhaps responsible for more so-called cholera

and swine plague than is the real cholera germ itself. As in the case of humans, there is very often a failure to discriminate between disease that is really due to germ infection, and that simply due to bad digestion. Besides these symptoms overfeeding is responsible for scours and rickets, and gives rise to other conditions that take valuable time to rectify, and meanwhile leave the pig in a condition susceptible to infection by every disease that afflicts hogs. And this is in addition to the wastefulness of the habit in the first place. The overfeeding of brood sows, particularly before and after farrowing, ruins more litters—both qualitatively and quantitatively—than any other cause. If there is any doubt about feeding at such times underfeeding is better than the other extreme. It should be remembered in feeding them, however, that the litter is being provided for as well as the mother, and this is true both before and after farrowing. With this in view no feed should be given which would have a harmful effect on the young. Sour and fermented feeds should be barred, and heating and high-protein feeds should be used sparingly. On the other hand, proper feeding is not a difficult matter if good judgment and common sense be used, and it will be found to yield certain and invariable returns to the hograiser who takes the trouble to give it proper attention.

WATER.

Pure water is one of the greatest essentials on a hog-farm. It should be constantly accessible to hogs in both winter and summer. Owners of farms

on which there is living water, as in springs and spring-fed creeks originating on the premises, have a splendid opportunity to construct storage systems that, with tanks and hog-watering devices, would make pure water of even temperature available to stock at all times. This may be termed the natural ideal water supply. Where dependence for water is on wells and windmills, storage tanks and cisterns can be used in collecting and distributing water. It is not advisable to allow hogs to drink from ponds, pools or running streams originating far away from one's own location. Such water is apt to be polluted and to carry disease germs. It is also of importance that all storage tanks, cisterns, watering tanks, hog-waterers and troughs be thoroughly cleaned and disinfected quite frequently. Whatever the source of supply, it is of special importance that the hogs be given at least twice daily a liberal allowance of pure water, even should it have to be carried a long distance in pails. Water can be used to excess, but hogs will not drink too much when it is freely accessible to them. It is advisable to heat it to a temperature of 70 to 80° F. by use of a tank heater during the winter.

CORN FOR FEEDING.

Corn is the basis of the best rations for practically every purpose in hog feeding. Other feeds should be used in various proportions as supplements to it, according to the end sought in feeding. Corn itself is not rich enough in protein to be used exclusively, and it has an excess of heat and fat-

forming constituents to make a balanced feed in itself. It is, however, an ideal finishing feed for a short course before marketing. When corn is used, however, with other farm-produced feeds the cost of production is cheapened, and the hogs are healthier, grow more rapidly and have better appetites than if denied corn. Unlike some other feeds, corn contains no injurious ingredients, and when harm does arise from its use it is either because the quantity given is too large, upsetting digestion, or because the corn is green, sour or mouldy. It should not, however, be used as an exclusive feed for brood or growing sows, as they require much more protein and mineral matter than it affords. From the nature of veterinary questions which I have read in the farm press it is certain that many of the diseases of hogs are due, directly or indirectly, to the excessive use of corn.

The excessive feeding of corn tends to diminish the strength of bone, retards the growth of frame and induces excessive fat. To avert these conditions use nitrogenous feeds, such as can be grown in practically every section where hogs are raised. Whatever these feeds are, roughage and pasturage should be included among them, as they cheapen the cost of production and give bulkiness.

Corn may be hogged down in the field, fed on the cob, shelled, cracked, ground or soaked, by itself or mixed with other feeds. For summer feeding it is best to soak it from 12 to 24 hours, while in the winter it should be fed dry, on the cob or shelled. Many feeders grind up rations of corn, alfalfa, wheat

and oats to feed during the winter, preparing their market hogs for summer finishing. Corn may also be ground with the cob. While this latter method gives good results, the expense of grinding, for corn alone, is hardly justified. In general practice the best method is to feed younger hogs dry corn while on pasture and feed soaked shelled corn to older and maturing animals.

CHEMISTRY OF THE CORN KERNEL.

The kernel of corn consists of six different parts: the hull, the horny gluten, the horny starch, the crown starch, the germ and the tip or cap, the proportions of which vary according to variety of corn, season, climate and soil, giving corn a considerable range of feeding value. The hull of a kernel is the thin outer coat, constituting about 6 per cent of the whole. It contains very little protein. Underneath the hull lies a horny material which comprises from 8 to 14 per cent of the whole, and is about one-fourth protein. Starch crowns and walls the kernel. The germ is about 11 per cent of the kernel and contains about 40 per cent of corn oil, which, of course, is a fat former. In growing corn for feed it would pay to select those types or varieties which show a small proportion of starch (white material) immediately surrounding the germ of the corn. Such corns have a relatively high-protein content.

HOGGING FIELD CORN.

Harvesting corn by turning hogs into the field has been adopted by many farmers in the cornbelt.

Where the farm is well-fenced and the feeder can limit the range of the hogs by cross-fencing, this method is profitable. The hogs, if handled properly, will not waste any more corn than they do when it is fed in dry lots, and much labor and time in harvesting and handling the corn are saved. The only drawback to this practice is the carelessness with which it is apt to be pursued.

Corn and Milk.—Separator milk balances corn and with it forms an ideal ration. Any feed supplementary to corn should be high in protein and ash and be of high digestibility and palatability. Variety is the spice of hog feeds. Fattening hogs need concentrates; breeding animals require considerable bulk. Feeds that meet all these requirements are wheat-shorts, alfalfa, bran, barley, oats, rye, peas and beans, while among the commercial feeds may be mentioned oilmeal, meatmeal, tankage and glutenmeal.

SUPPLEMENTS TO CORN.

Since corn is low in protein and relatively high in fat-formers, it makes an ideal finisher, but for all general purposes it should not be fed alone. Supplementing it with other farm-produced feeds cheapens the cost of producing pork, hogs are healthier, gains are more rapid, digestion is increased and less risk is incurred. While it is advisable in the corn-belt to use corn in all hog rations, the amount should be regulated. Given in moderate amounts it does not have any harmful effects, nor is there anything in it harmful to hogs; the only bad effects from feeding sound corn are due to its use in excessive

amounts. If it is of inferior quality it may derange digestion. Sour, mouldy, rotten or green corn should be fed with caution. Excessive feeding of corn tends to diminish the size and strength of bone and weaken the constitution. Feeders must learn what feeds in their localities are best adapted to use in connection with corn.

WHEAT.

Fed whole, cracked or ground, dry or soaked, wheat is a valuable hog feed. Best results are gained by grinding or soaking it for 12 hours. This prepares it for more thorough digestion. Wheat, like corn, should not be used as an entire ration; it should be mixed with other feeds. There is more protein in wheat than corn, but the fats are lower. So wheat is often used to balance corn. Hogs can be finished exclusively on wheat, making gains comparable in rapidity with those obtained from corn; but the quality and finish of the pork will be inferior. Moreover, the high price of wheat makes it unprofitable to feed for any considerable length of time, so the farmers resort to the by-products of wheat, such as shorts and bran, to secure valuable nutrients at economical prices. Many hogmen pasture hogs in wheatfields in the fall, winter and spring, and this affords much needed forage and does much to promote good health. Besides it will not injure the wheat, if it be pastured judiciously.

RYE.

In protein content rye ranks higher than oats, corn and barley, and in heat-forming constituents

it rivals corn. This makes it objectionable for brood sows and young pigs. In its per cent of fat rye ranks low among the grains. By mixing it with other grains profitable use can be made of it in feeding hogs. Rye is fed dry or soaked, whole, cracked or ground, but it should not be allowed to ferment. Rye often contains ergot, for which the feeder should keep a lookout. Hogs are pastured on rye with good results during the fall, winter and early spring. If it is not grazed too short it will make a grain crop.

OATS.

Like wheat or rye, oats may be fed whole, soaked, ground or mixed with other feeds or by pasturing the green plant. Oats are higher in protein and lower in starch than corn. Oats give good results fed to brood sows and are useful as a part of a growing pig's ration. In view of their cheapness oats should be in more general use, especially for brood sows and growing pigs, but this grain can not be considered as an exclusive feed, largely on account of its being too bulky.

SHORTS AND MILLINGS.

Shorts is a by-product from milling wheat for flour. If the patent process of milling is not too fine or if the shorts are not adulterated, shorts makes an excellent balance for corn. In protein it is richer than whole wheat. Shorts may be fed dry or mixed with water or milk made into slops. The summer feeding method is to soak shorts from one feeding time to another, feeding it as a slop in

connection with grain, milk and pasture, but never allowing to sour. Keep all buckets, barrels, troughs and the like clean. In the winter better results are secured from dry feeding or when the shorts is mixed with alfalfa, wheat, oats and bran. Shorts is used in nearly all combinations in pig feeding, and when fed as a supplement to corn it will cheapen the cost. It is a cheap supplement even when its per cent is one-third higher than that of corn.

BRAN.

Bran makes a good laxative for brood sows. It is mostly the husk of wheat berries and is flaky and light, being of such bulk that a hog cannot consume much more than it can digest. Bran fed in connection with alfalfa, oats and a little corn makes an ideal milk-producing and bone and tissue-building feed, especially for brood sows. It should not form more than 20 per cent of the bulk of a ration. It should not be used as a base in any ration except perhaps for farrowing sows or convalescents.

GRINDING FEED.

The grinding of any grain to be fed by itself is not always profitable, but the grinding of one or more together to form a combination or balanced ration is of greater value. Grinding wheat, oats, corn and alfalfa together makes one of the best rations that can be secured. Corn as a rule is not improved when ground alone for exclusive feeding. Ground wheat, rye and barley give rather better results than when fed unground, but more profitable

results follow mixing them together and feeding dry in winter and soaked or in slops in summer. Any farm feed that is too rich or strong is improved by grinding it with some other feed that will balance the combination. It is well to study the nutritive values of feeds and to experiment with those produced abundantly on the farm, grinding and mixing them in different proportions.

One of the prime objects in grinding is to put feed in a better form for easy digestion, thus minimizing the percentage of waste. A saving from 5 to 10 per cent is often effected in this way. Hogs swallow much of their feed whole, and a large percentage of it passes through them undigested. Grains easily digested do not require grinding, while hard, dry feeds, slowly digested, give best results when ground or soaked. In this condition they are acted on more effectively by the digestive fluids. Grinding does not increase nutritive value except by preparing slow-digesting grains for maximum assimilation.

On the whole there is little profit in the grinding of common grains, as nature has furnished the hog with grinders of its own, but if corn is more than 50 cents per bushel, and very hard, a small saving with some benefit may be secured by grinding.

SOAKING FEEDS.

The practice of soaking feeds results in their better distribution among the swine, greater ease in digestion and assimilation, greater palatability in

many cases, and the intake of a greater quantity of water. Soaked feeds being bulkier than the dry feeds, the hog is less likely to overeat. The fact that feeds are soaked, however, does not obviate the necessity of having a constant supply of drinking water. While soaking has these advantages, it also involves labor and expense, and so it only pays under proper conditions. Soaking, for short periods, has value as an appetizing way of varying rations. Grains may be soaked for short periods, and the frequent changes from soaked to dry grains will be found a good method of holding the appetite. Among the grains materially improved by the process are the harder or flint types of shelled corn, shorts, cracked wheat, bran and ground oats. Grain should only be soaked as it is needed; otherwise it will become fermented and unsuitable, if not altogether unfit, for feeding purposes. Hogs running in dry lots will respond better to soaked or ground feeds than will those having plenty of pasturage. In estimating whether or not soaking will pay in any given case, it may be figured that the process represents a saving of from 5 to 10 per cent in the value of the feed.

CHARCOAL AND MINERALS.

Hogs need mineral salts and charcoal if they are properly to develop and keep healthy. Under natural conditions they obtain salts by eating earth which supplies them with lime, phosphates, silica, other inorganic salts, and carbon. To prevent them

rooting up large patches of ground these salts should be supplied. Lime may be given slaked, in a light mortar with sand or in a solution of a pint of lime to a barrel or water. It acts as a corrective. Wood ashes and soft coal may be fed; the hogs will not eat too much of the former, but they may eat an excess of coal, whose main agency is to supply gritty matter and sulphur. These should not be fed in water, as they may set up undesirable chemical reactions. Charcoal may be made right on the ground by firing heaps of wood or corncobs until they burn cherry red throughout, throwing salt on the burning piles, and then covering them with damp earth or pouring water on them. Hogs may be given free access to this charcoal. It is a most valuable cleanser of the digestive tract and acts as an absorbent of gases and other undesirable by-products of digestion. A good plan is to prepare a mixture of charcoal, salt and ashes, and give the hogs access to it. Common salt is a stimulant and should only be given sparingly mixed with other substances. It is, however, a necessary constituent of the blood. Ashes of burned bone, vegetation and bonemeal are both valuable aids to bone formation.

COOKING FEEDS.

The cooking of grains is not recommended for general use, although cooking may produce better gains at certain periods on fattening hogs. However, it is advisable to cook feeds for stunted or unthrifty fall pigs during the winter. But the practice for

any extended period will develop weak constitutions, soft bone and delicate appetites. The steaming or warming of slops, alfalfa, oats, potatoes and roots is beneficial when these are fed in connection with grains to the breeding herd and fall pigs during intensely cold weather. I do not, however, consider it advisable thoroughly to cook any feed for any kind of stock unless for sick hogs. Feeds used at nearly normal temperature give better results than those either above or below normal. The more natural all feed and conditions are the better. We can aid Nature in many useful ways; we can also hinder her work by following artificial methods in management. We should seek to be simple and wise in these matters.

BARLEY.

Like wheat, oats and rye, barley gives its greatest benefit when combined with corn. Hogs can be fed almost exclusively on any one of these grains, but their values are greatly increased when fed mixed. Barley is a great muscle and tissue-builder. It gives a general evenness to the body and develops pork of the bacon type. But it does not produce a high finish, especially in the back fats and the covering of the hams and shoulders. Its most apparent result is a more growthy appearance, and a more even distribution of lean and fat, especially in the sides. Barley is generally much cheaper than wheat, and as it takes only slightly more of it than of corn to produce the same results in gains or weight, it should be more generally fed as a part of the ration

for hogs. It is also pastured by hogs, giving profitable results during winter and early spring.

EMMER OR SPELTZ.

The composition of emmer is: Protein, 10.50; carbohydrates, 72.41; fat, 2.32; ash, 3.89 per cent. It is also called speltz, and is a barley-like grain with a coarse husk-covering like that of oats. It is grown in the northwest part of the hogbelt, and used considerably, after grinding and soaking, as a feed for developing and fattening, being used either with or without corn. As emmer is cheaply and abundantly produced, averaging from 30 to 75 bushels per acre, more attention should be given to its growing and use. Its nutritive value is seemingly very high, but in practice emmer does not equal corn, as it takes nearly 100 pounds to give the same gain that can be obtained with 70 pounds of corn.

COWPEAS.

The value of cowpeas is comparatively little known as a hog feed in the cornbelt, although extensively used in many localities where they are more easily produced than corn, the northern and western states' soil, climate, etc., being very favorable for the production and use of field peas. The composition of peas is practically the same as that of beans, the two being the highest in protein of all farm-produced feeds. Cowpeas generally are pastured, and the Canadian field pea, sown with oats, is highly recommended for this purpose. Hogs using such pasturage are usually fattened and fin-

ished for market on the ripened peas or with grain. The finished carcasses of hogs fed in this manner are commonly of a bacon type with very little thick fat, such as corn feeding produces. Peas are sown in June and begin to ripen in August, and this is the best time to begin pasturing them.

SOYBEANS.

This legume has a high value as a flesh-former. It is generally pastured as a summer forage. Some feeders grind the beans into a meal and balance it with other feeds. As cheapness of production and high nutrient value seem to promise a new and profitable feedstuff, their use should be thoroughly investigated. Beans are planted and fed to hogs in much the same manner as are cowpeas.

RAPE.

This is an annual cabbage-like forage plant that is seeded in corn at the last cultivation or in land especially prepared for it to produce green feed for pigs and sheep. It is considered one of the best forages for hogs. It is advisable to plow up small yards and pens and seed them to rape. This method creates sanitary conditions in the yard, destroying germs and renovating the soil, besides furnishing forage. Rape pasturage gives good results, especially when supplemented with grain rations. Dwarf Essex is the most reliable variety and many hog feeders practice sowing a crop for early pasturage, and another in August for late pasturage. So favorably impressed have I been with this crop that I

would urge every breeder to grow at least a small patch of it each season.

COTTONSEED-MEAL.

This concentrate is rich in protein, and should be fed with caution. It often causes serious derangements when fed for 40 days. Breeders in the cottonbelt feed it for a short time in connection with other feeds. It is used more extensively in the South.

TANKAGE.

In this by-product of the packinghouses the nutrients are, approximately: 44.1 per cent protein, 7 water, 18.7 ash, 7.2 crude fiber, 9.4 nitrogen-free extract and 13.6 ether extract, for the low grade or fertilizer brands; and 61 protein, 7 water, 15 ash or mineral, 7 crude fiber, 10 fat, approximately, for the high grade hogfeeding brands. Tankage is made from packinghouse meat scraps, refuse and offal, steamed and dried with intense heat, and ground into meal. Some feeders are foolishly prejudiced against it on account of its composition. I consider it a highly valuable concentrate used in connection with grain and pasturage. Have a care not to feed it so strongly as is generally recommended or for any considerable length of time. Breeders commonly use it in brood sow rations and for growing pigs. In feeding it to pigs under five months of age great care should be taken not to overfeed.

COMMERCIAL FEEDS.

Broadly speaking, hograisers in the cornbelt have small need of commercial feeds. Every well-

managed farm produces all necessary feeds. With corn, wheat, alfalfa, clover, rape, milk, soybeans, rye, oats and roots the hograiser is able to select and combine economical and effective rations for all classes of hogs. The cost of commercial feeds has to be computed from the price paid to farmers for the main ingredients; then add the cost of high-priced labor, interest on and maintenance of costly plants, advertising and selling expenses, together with freight on raw materials to the manufacturer and on the finished product back to the consumer, and a percentage of profit for manufacturers and dealers. Grain and forage crops suitable for hog-feeding can be grown cheaper than they can be bought in patented combinations. Besides they are infinitely superior in quality to purchased feedstuffs, as the latter often contain sweeping husks, dirt and refuse mixed and ground up with low grades of wheat, corn, oats and the like. Oilmeal and packinghouse products are generally of more creditable origin, and when a hogman cannot produce enough protein it would be advisable for him to feed such materials, especially tankage.

MEATMEAL.

Like tankage, this is a packinghouse product. The proportion and nature of protein is slightly higher than in tankage and the ash content is about the same. It is a more desirable feed than tankage on account of its better raw material, being made mostly of meat scraps, but its nutritive value is practically the same.

BONEMEAL.

Bonemeal also comes from the packinghouses. It consists of ground bones that have been heated enough to destroy all germ life. The feeding of bonemeal gives good results in bone-building, although this can be supplied to a great extent through other feeds on most hog-farms, especially milk.

GLUTEN FEEDS AND MEAL.

Under this general heading are included glucose meal, cream gluten, gluten flour, glucose feed, dried sugar feed or meal, maize feed, starch feed, hominy hearts and other similar materials obtained as by-products from the manufacture of starch and glucose from corn. Gluten is the tenacious, viscous constituent in the meal that makes it suitable for bread. These feeds give fairly good results in connection with farm feeds, but like all other concentrates, must be given in a balanced ration and for limited periods.

BLOODMEAL.

This is simply dried blood that may be fed in connection with grain. It helps to produce better growth, especially in the development of frames.

OILMEAL.

Oilmeal is ground cake pumice left in the manufacture of linseed oil from flax seed. It has medicinal value, and is very strong feed, high in protein and fat, compared with natural feedstuffs. It is used for laxative and cooling purposes in connection with other feeds. It is considered as one of the best

concentrates when used in proper proportions with other farm-produced provender. It is generally used in developing rations; however, tankage excels it for this purpose.

APPLES.

Hogs should utilize to advantage all wholesome waste by-products of the farm, and as there are usually many bushels of "windfall" apples in all orchards, it is well to pasture hogs therein. Both hogs and orchard are benefited. The fallen apples are appetizers and a tonic, and have some value in forming flesh; while, on the other hand, the orchard is kept clean of wormy, decaying apples, which would otherwise breed many tree and leaf diseases. Where trees are protected from rooting this method is as beneficial to an orchard as an annual spraying. Hogs should not be fed apples excessively or exclusively.

CARROTS.

Carrots are low in nutritive value but may be fed sparingly as an appetizer or as a corrective for kidney ailments, and to aid such digestive troubles as colic or dyspepsia.

POTATOES.

Potatoes are richer in protein and fat than any other root crop excepting artichokes, and may be fed, raw or cooked, during fall and winter feeding. A common practice is to boil small potatoes and potato peelings with corn, wheat or oats, making a slop, and feeding it to convalescents or runts or to fall pigs during the closed winter season.

ARTICHOKES.

Artichokes and potatoes in composition are very similar, each containing more protein and fat-forming elements than other root crops. Both are used as laxatives and in brood sow rations. Artichokes are "hogged out", fed raw or cooked.

MILO MAIZE AND KAFFIR-CORN.

Both of these crops are becoming popular with many hog feeders of the South and West, where they are produced in abundance at low cost. The ripened seeds ground into meal are fed separately or mixed with other grains. Both crops possess some value for developing and fattening, but do not give as good results independently as they do when balanced with corn. The cheapness of their growing, however, promises to make them a factor in the future production of pork, and all breeders would do well to experiment in their use, wherein it is practical.

SWEET CORN.

Sweet corn is one of the best late summer and fall feeds for hogs when given in connection with any matured grain, and it is generally fed, stalks and all, to furnish roughage. It has not the disadvantages of unripened field corn and, if given in balanced amounts, will not produce serious digestive ailment. It is a great promoter of growth and may be used as a roughage from the milk-stage until frost.

GREEN CORN.

Many breeders by the injudicious feeding of green or immature field corn cause digestive ailments

in their herds. So far as the corn itself is concerned it does not contain harmful ingredients or cause diseases, unless it is consumed much in excess of the hog's capacity to digest and assimilate it. It may be fed with profit when given in amounts that will serve as a relish and appetizer, and it is always advisable to begin feeding the new crop by giving small allowances first, gradually increasing it to a full ration, in connection with matured feeds.

TURNIPS.

This watery root crop is a cooling laxative. It is fed, like other roots, to supply forage during the winter for brood sows and young, growing pigs. Turnips are fed either raw or cooked, but they should not be too large a fraction of the ration, as they do not contain sufficient nutrition to sustain life if used exclusively.

MANGELS.

Mangels are a valuable root feed, being nearly equivalent to beets but lower in heat. They make a good supplement to high grain rations, are appetizing and give welcome results when fed as a part of a brood sow's rations during the winter. They may be fed either raw or cooked.

SUGAR BEETS.

The composition of sugar beets is 1.8 per cent protein, 10.2 carbohydrates, 0.1 fat and 0.9 ash. They are one of the best root crops for winter feeding. For hogs on grain rations they are good appetizers. For brood sows beets are a laxative, and they allay

fever. They may be fed raw or cooked, but should not form at any time more than 40 per cent of a ration.

RUTABAGAS.

Breeders find rutabagas a valuable root crop for feeding as an appetizer, laxative and supplement to high grain rations, and as a part of brood sows' and fall pigs' feed. Feed raw or cooked.

BUCKWHEAT.

This is a good substitute feed that is lower in protein than any other common grain. It is fed ground for fattening purposes, but it would not be advisable to feed it to brood sows or growing pigs.

PUMPKINS AND SQUASHES.

Pumpkins or squashes in a raw or cooked state form an appetizing and tonic ration in the fall and winter feeding of young pigs and brood sows. The seeds have some value as a vermifuge and regulator and as a corrective of the urinary system. Neither pumpkins nor squashes can be considered as an exclusive feed, as neither contains sufficient nourishment. Pumpkins should be grown and used in abundance on every hog-farm.

ALFALFA.

The composition of a pound of alfalfa hay is 10.55 per cent protein, 37.33 per cent carbohydrates and 1.38 per cent fat. Of green alfalfa it is 3.89 protein, 11.20 carbohydrates and 0.41 fat. Of alfalfa silage it is 3 per cent protein, 8.50 per cent carbohydrates

and 1.90 per cent fat. Alfalfa ranks with corn as a base feed for hogs, and the time is not far distant when every pork-producer will have to rely on it to compete with producers who have abundant forage feeds. The cost of grain and fattening feeds will be higher in the future and only such abundant and easily-grown feeds as alfalfa will fill the breach between the cost of growing and eventual profits. So far hog feeders have not found a forage plant to compare with it for all-around hog development, nor have they begun to get anything like the full benefits out of the plant that await its intelligent utilization. Alfalfa can be grown in almost any locality and soil in the United States, the author having seen it cultivated on the hardest gumbo soil and again on the sandiest soil, in places where corn would not begin to grow. The only kinds of soil which will not bear alfalfa are extremely dry rock formations and those which are constantly wet. Properly-managed alfalfa pastures will last almost indefinitely, and if they do become "killed" by such causes as gophers, too close hog pasturing, from allowing horses to eat the crowns, or from freezing out where water is collected, the land will be found, on account of the nitrogen-fixing nodules on the alfalfa roots, to have been benefited immensely in crop-producing power. In fact, alfalfa does for land just what a well-worked manure spreader does. Soils that have borne alfalfa for some years are not only made as good thereby as virgin soils, but they may be made to produce more than they ever produced in the virgin state.

It is not uncommon for 40 or 50 bushels of wheat to be produced on an acre of old alfalfa ground from which, previously to its alfalfa planting, only 15 or 20 could be taken. And 20 or 30-bushel acres have been made into 75 or 100-bushel acres. While it is practically impossible to estimate the dollar value of alfalfa per acre, conservative hograisers have claimed \$100 in pork and hay from an acre of the plant. Fifty dollars at any rate can be realized from an acre in ordinary practice.

Alfalfa is fed either as pasturage or in the form of hay. In the latter case it may be fed straight or may be chopped up and ground into meal and fed wet or dry, alone or with corn, wheat and oats. When thus mixed, however, it is generally fed as a thick mash. An acre of alfalfa, perfect in stand, and on good soil, such as bottom land, will provide ample forage for 10 or 12 pigs of 80 to 100 pounds or for one to three brood sows and their litters, feeding continuously from farrowing to weaning. And in addition to that, the acre will produce one or two tons of hay. More service than this has been obtained from an acre, in fact, but too close pasturing will lessen the production and may even kill the plant. An acre of alfalfa of lighter stand and on poor ground may provide forage for six or eight 100-pound pigs or one sow and litter, and still be good for a ton or more of hay. In fact, under ideal conditions, an acre of alfalfa may produce in pork and hay, every year, practically the value of the land on which the alfalfa grows. When the alfalfa be-

comes weak in stand and vitality it is best to plow it under, and after several other crops have been grown from the same ground the alfalfa can be reseeded. During pasturing alfalfa should be mowed three or four times in the season. This removes the coarse, woody stems of the plant, and the renewed growth supplies the hog with almost continuous tender, succulent forage.

BROOD SOW RATIONS.

A good ration for brood sows running on alfalfa pastures is as follows: 5 or 6 pounds of corn or its equivalent, according to the size of the animal; and 1 pound of shorts, fed in a thin slop, and free access to clean water, wood ashes and salt. For pigs, the corn ration must be adjusted to their powers of assimilation. They should be given the same amount of shorts as the brood sow, but with the addition of milk once or twice daily. The results in flesh and bone development from this ration will be unsurpassed. For fattening hogs with well-developed frames and weighing 200 pounds or more, the corn ration should be increased to 8 or 10 pounds daily, or 1 bushel of shelled or ear corn to seven or eight hogs. One pound of shorts should be given, and $\frac{1}{8}$ or $\frac{1}{4}$ pound of tankage will prove profitable. These weights cannot always be adhered to exactly, and it is a safe rule to incline to a few ounces less rather than to an excess in making them up. The feeding of alfalfa hay and meal occurs mostly in the winter. The hay should be cured carefully in order that it may remain green and retain its nutritive value.

The third and fourth cuttings are the best for hog-feeding. The hay may be fed from racks or on feeding floors or the hogs may be allowed to eat down the stacks. Three or four pounds of hay daily, in addition to the grain feeds, is a good average allowance. It should not be fed without grain or in excess of the quantity indicated.

The following mixed ration has been adopted by many breeders for brood sows and growing hogs: Alfalfa, 28 to 30 per cent; corn, 18 to 20 per cent; oats, 18 to 20 per cent; shorts, 15 per cent; bran, 15 per cent; oilmeal or tankage, 2 to 5 per cent. In this ration the fattening feeds are increased or lessened as the required results dictate. The best method of preparing this ration is to grind or finely chop the alfalfa, and mix it with the other ingredients after they have been separately ground and then mixed. This should be done in a fair-sized tank, and sufficient water added to make a thick mash. In winter the water should be warm or even scalding hot. After the mixture has soaked for an hour or so it may be fed in troughs or on the feeding floor. It will be found a profitable ration.

ALFALFA HAY.

The avidity with which hogs in some parts of the West go to dry alfalfa in stacks has surprised many observers. On a large breeding farm, just within the shades of the Kansas Agricultural College, there were, according to Prof. John M. Evvard of the Iowa Experiment Station, 200 Duroc-Jerseys, some 30 per cent of which were brood sows. These pigs

practically all had the run of a large, luxuriantly-growing alfalfa pasture and were fed in addition corn, shorts and tankage. Off to one corner of the place, somewhat unhandy for the pigs to reach, yet accessible, there stood a large stack of first cutting alfalfa. The hogs would stop at this stack in the morning and at night on their way to and from the field, and even go to it in between times, eating great quantities of this first cutting hay. The shape of the stack reminded one of the strawstacks seen in the cornbelt in the spring after cattle have run around them the entire winter. It showed the preference of the hogs for dry stacked hay as a part of their ration. Although the green growing alfalfa grew right at the hogs' feet, yet they preferred to eat considerable quantities of the dry hay. Of all the hogs the brood sows seemed to show an exceptional fondness for it, this seemingly indicating that alfalfa satisfied their appetite and craving for furnishing bone and growing materials for the development of the foetal babies

CORN AND ALFALFA.

Of especial consideration is the ash content of alfalfa compared with corn, as for every thousand parts of the dry substance alfalfa contains a total of 73 parts of ash, while corn contains only 15 parts per thousand, according to the Iowa Experiment Station. Then, too, with alfalfa there is an excess of basal mineral elements over acid ones to the extent of 1,304 cubic centimeters of normal solution in 1,000 grams of dry substance as compared to an opposite

acid excess of 117 on the part of the corn. It is essential in a correct growing ration to have a basal excess. Then, too, on the other hand alfalfa contains 21.44 parts of calcium per thousand while corn contains but .11 parts or 200 times the bone-building element. Of potassium alfalfa contains 16.41 as compared to 3.20 corn (grain) or of the neutralizing regulating agency. Corn is high in phosphorus, the bone-producing running-mate of calcium, yet alfalfa contains slightly more—or a comparison of 3.36 parts to 3.38 parts. These figures would indicate alfalfa's usefulness as a brood sow feed, hence their seeming great relish of it. However, just why they should prefer the dry to the green would be a different matter. One ordinarily thinks first-cutting alfalfa not so well adapted to hog feeding as the third or fourth. This is undoubtedly true, but then under certain conditions when the first cutting is quite leafy and is cut early and cured well hogs show a great liking for it.

ALFALFA WITH RYE.

An Ohio farmer writes: "We prefer the third cutting of alfalfa hay for hogs. For two winters our brood sows have been fed alfalfa. We use the ordinary feed cutter, cutting it as fine as possible. We moisten the cut hay and usually feed a small ration of middlings or ground rye, mostly rye, adding the shelled corn, and feed it in a deep trough, one feed per day. We give probably two-thirds of a pound of hay per hog. It is weighed after being cut in dry form. We have not tried a heavier ration of alfalfa, as this amount carries our hogs along

nically. Alfalfa is thrown from the mow into a box on the barn floor, so there is no waste of leaves. Last winter our fall pigs were fed alfalfa from the latter part of January until March. Pigs do not eat it quite so readily as the hogs do. I doubt, considering the waste made by crowding, if they consumed one-fourth of a pound. Some lots of pigs will consume more than others. One can get the pigs to consume a greater quantity by adding a heavy ration of ground feed to the alfalfa, but this is not advisable. We would suggest feeding a small amount and noting results, as no set rule will answer. There has been some question if the short-cut stems might not internally injure pigs. We have had no trouble on this score. We prefer having the pigs weigh 50 pounds or so before beginning the ration, although in some cases they might consume enough to pay for the extra work earlier. We feed the ration in the same form as to the old hogs, differing in proportion as a matter of course.

“Alfalfa is practically taking the place of mill-feed; it is a supplement that has protein and makes a bulky ration for winter feeding that is necessary. Our spring pigs come nice and strong. In very cold weather water is warmed for the older hogs, so as to moisten the ration, and this is more necessary for pigs. It would be much easier simply to throw out the corn and let it go at that; but experiments furnish positive evidence that a protein feed will make corn more efficient and decrease the cost of production, and we are certain that we have

discovered no facts to the contrary." Here is a point of the utmost practical value to western pork-makers.

HOGGING OFF RYE.

IN THE BREEDER'S GAZETTE of Dec. 7, 1910, an Ohio correspondent gives his experience as follows: "I commend this practice, for after giving it as thorough a test as is possible I am satisfied it is a success. On July 26, 21 spring pigs weighing 1,425 pounds were turned on about three acres of rye, rape and clover. These pigs took to the rye and clover from the start, but the rape was not eaten. On Sept. 21, when taken off the rye, they weighed 2,520, a gain of 1,095 pounds, at 9 cents market price then, or \$98.55. The rye crop was estimated at 45 bushels at 70 cents market price, or \$31.50. During the last three weeks they were fed 60 bushels of corn at 50 cents, or \$30, making the total cost of feed \$61.50 or a net gain of \$37.05, to say nothing of the value to the land, and this at a very slight outlay of labor."

On the same subject another writer in the same issue says: "We turned 62 February pigs into five acres of good rye on July 17 and left them in until Aug. 29. They ate little more than half of the rye; the remainder either volunteered or rotted on the ground. If these hogs had relished the rye, they should have cleaned it up in 30 days. This is the second time that we have hogged rye; the third trial will never come. We had good clover in the rye and gave some slop; we cut down slop in an endeavor to compel the shotes to eat rye. The only thing that

we have to say in favor of hogging rye is that it is possibly better than grass alone. To compare it with soaked corn as a summer feed, we must surely say to buy corn every time. When hograisers quit meddling with rye, barley and soybeans and learn to rely on corn they will have learned the essential that has made our best feeders successful.”

A KANSAS PIG RATION.

At the Kansas Experiment Station Prof. R. J. Kinzer says he made the best growth and gains on pigs by feeding a ration consisting of about 50 to 60 per cent corn, 35 to 40 per cent wheat shorts and 5 to 8 per cent tankage.

SOME TESTED RATIONS.

For small pigs the Wisconsin Experiment Station recommends the following ration, made up on the basis of 100 pounds of mixed feed and fed in the shape of a thick slop: ground oats, free from hulls, 35 pounds; wheat middlings, 35 pounds; cornmeal, 20 pounds; oilmeal, 8 pounds; salt, 2 pounds.

A Growing Ration.—Cornmeal, 30 pounds; ground oats, 20 pounds; wheat middlings, 30 pounds; oilmeal, 8 pounds; salt, 2 pounds.

A Brood Sow Ration.—Cornmeal, 23 pounds; ground oats, 23 pounds; wheat middlings, 23 pounds; wheat-bran, 23 pounds; oilmeal, 6 pounds; salt, 2 pounds.

PASTURE FOR HOGS.

I attach great importance to the use of pastures in producing cheap pork. Clovers, alfalfa and

grasses for grazing should be grown on every hog-farm. It is on pasture and forage that pigs lay the foundation for their future usefulness for fattening. The following table shows the periods when given grazing crops are available and the number of 100-pound hogs which an acre will carry:

Alfalfa	April to November.....	5 to 10 hogs
Clover	April to October.....	3 to 8 hogs
Kentucky bluegrass.....	March to October.....	3 to 8 hogs
English bluegrass.....	April to October.....	3 to 8 hogs
Prairie grass	June to September.....	2 to 4 hogs
Oats.....	April to July.....	4 to 8 hogs
Rape	May to October.....	12 to 18 hogs
Rye.....	Late fall, winter and spring	4 to 8 hogs
Wheat	November to March	2 to 4 hogs
Cowpeas	August and September.....	6 to 8 hogs
Soybeans.....	August and September.....	6 to 8 hogs
Artichokes	November to March.....	10 to 20 hogs
Sorghum.....	July to October	15 to 20 hogs

CLOVER.

This legume ranks close to alfalfa as a forage for hogs. For best results in pasturing it, I advise to mow it quite often, so that there shall be plenty of tender growth. This also removes the tough and older stocks. Clover hay for winter feeding is almost as valuable as alfalfa, but in curing it does not retain as much protein as alfalfa. Clover is sometimes fed ground into a meal as a part of a ration for brood sows.

TIMOTHY.

For hogs timothy is mainly a pasture plant, giving much the same results as bluegrass, bromus inermis and prairie grass. It is often sown with clover; the combination affords excellent pasturage

for hogs. Where other forage is scarce, straight timothy pasture may be used in connection with grain.

MILLET.

Used chiefly as a pasture for hogs, millet is commonly seeded with rape and millet in hog yards and small lots to produce forage for summer feeding. Millet seed has but little value as a feed, and the best use to make of the hay is for bedding purposes.

SORGHUM CANE.

Sorghum is commonly used for feeding and as a pasture. Both the cane and seed make a heavy crop per acre and when supplemented give fair results. As a forage sorghum will pasture a large number of hogs per acre. In its young or tender state it does not make material gains, but after it reaches the sugary state it is an excellent feed to rejuvenate run-down hogs. Some feeders claim medicinal value for it.

THE VALUE OF MILK.

Separator milk is more valuable than many hog-raisers seem to think. The removal of butter-fat, besides being profitable from a dairying standpoint, leaves the milk a better feed for hogs than whole milk would be. In these circumstances it would well repay the hograiser to carry on a dairy business which will give him a feed that cannot be replaced, at the same cost, by any grain feed. Separator or skimmilk is best fed before it has lost its

natural heat, and while it is still in a sweet condition. Occasionally, however, it will sour before it is practicable to feed it, and in such a case, provided the souring is only slight, no harm will be done by feeding it. Milk fed in conjunction with grain insures the proper development of bone and muscle, the milk containing a large proportion of mineral material needed for bone growth. On account of its large proportion of protein it should not be fed in excess, for the quantity of protein the hog can digest is limited. For the same reason the amount fed should be relatively greater in young, growing pigs, and should be decreased when, full growth being attained, the demand for protein is lighter. To insure the most thorough utilization of the milk fed small quantities should be given at frequent intervals. If the ration of milk is given in one large dose the curdling, which is the first step in digestion, is too great, and the stomach fails to deal with the large mass of curd. Milk will be found to be a valuable appetizer for hogs that are losing appetite or convalescing.

A well-balanced milk ration consists of approximately 1-10 corn, 4-10 roughage, 3-10 water and 2-10 milk. If the actual amounts here are regulated according to the age and size of the animals, the value of the milk will be from 25 to 50 cents per cwt. Cow's milk is not so rich as sow's milk, and so at first in feeding it larger quantities may be given than were consumed before weaning. But for any pig under 100 pounds a quart at a feeding should

be sufficient. Buttermilk is not so good a feed as skimmilk, as it has lost more nutritive value in the butter extraction, and is sour and more diluted than ordinary milk. Some buttermilk should never be used, as it contains such chemicals as sulphuric acid, salts or alkalis, used in separation by some creameries. But buttermilk which the feeder knows to be fresh and pure may be fed with economy and good results. It should be given sparingly to young pigs, however, as they do not seem able to digest much of it, and even with older hogs the bulk given should not be over half the total ration. Its value, when fed to pigs, may be from 15 to 30 cents per cwt.

NUTS FOR FEEDING.

Hogs relish all kinds of nuts, as acorns, pecans, walnuts and hickory nuts. In localities where there are large areas of nut-bearing trees hogs are able to secure a living and even fatten on mast and forage plants during summer and fall. Hams and bacon from hogs thus fed are usually of the highest quality and flavor. Nuts also have a tonic value.

QUART WEIGHTS OF FEEDS.

In calculating rations where it is unhandy to weigh the feeds, the following table of quart weights are given :

Corn, whole grain..	1 pound, 14 ounces	Wheat bran.....	0 pound, 10 ounces
Cracked corn.....	1 pound, 12 ounces	Rye bran.....	0 pound, 10 ounces
Cornmeal.....	1 pound, 8 ounces	Gluten meal.....	1 pound, 11 ounces
Corn-cobmeal.....	1 pound, 6 ounces	Gluten feed.....	1 pound, 3 ounces
Oats, whole.....	1 pound, 0 ounces	Linseed-meal.....	1 pound, 2 ounces
Oats, ground.....	0 pound, 12 ounces	Cottonseed-meal..	1 pound, 8 ounces
Wheat, whole.....	1 pound, 14 ounces	Separator milk....	2 pound, 0 ounces
Wheat, ground.....	1 pound, 13 ounces	Water.....	1 pound, 12 ounces
Wheat middlings..	1 pound, 12 ounces		

COMPOSITION OF FEEDS.

In the following table, taken from a Farmers' Bulletin published by the United States Department of Agriculture, breeders and feeders will find information of much value, if it is intelligently applied. We can never feed economically or wisely unless we know something about the composition of the materials used.

DRY MATTER AND DIGESTIBLE FOOD INGREDIENTS IN 100 POUNDS
OF FEEDING STUFFS.

Feeding stuff.	Total dry matter.	Protein.	Carbohy- drates.	Fat.	Fuel value.
	lbs.	lbs.	lbs.	lbs.	calories.
Green fodder:					
Corn fodder.....	20.7	1.10	12.08	0.37	26,076
Kaffir-corn fodder.....	27.0	0.87	13.80	0.43	29,101
Rye fodder.....	23.4	2.05	14.11	0.44	31,914
Oat fodder.....	37.8	2.44	17.99	0.97	42,093
Redtop, in bloom.....	34.7	2.06	21.24	0.58	45,785
Orchard grass, in bloom.....	27.0	1.91	15.91	0.58	35,593
Timothy, at different stages.....	38.4	2.01	21.22	0.64	45,909
Kentucky bluegrass.....	34.9	2.66	17.78	0.69	40,930
Hungarian grass.....	28.9	1.92	15.63	0.36	34,162
Red clover, at different stages.....	29.2	3.07	14.82	0.69	36,187
Crimson clover.....	19.3	2.16	9.31	0.44	23,191
Alfalfa, at different stages.....	28.2	3.89	11.20	0.41	29,798
Cowpea.....	16.4	1.68	8.08	0.25	19,209
Soybean.....	28.5	2.79	11.82	0.63	29,833
Rape.....	14.3	2.16	8.65	0.32	21,457
Hay from—					
Redtop.....	91.1	4.82	46.83	0.95	100,078
Timothy (all analyses).....	86.8	2.89	43.72	1.43	92,729
Red clover.....	84.7	7.38	38.15	1.81	92,324
Alsike clover.....	90.3	8.15	41.70	1.36	98,460
White clover.....	90.3	11.46	41.82	1.48	105,346
Crimson clover.....	91.4	10.49	38.13	1.29	95,877
Alfalfa.....	91.6	10.58	37.33	1.38	94,936
Cowpea.....	89.3	10.79	38.40	1.51	97,865
Soybean.....	88.7	10.78	38.72	1.54	98,569
Roots and tubers:					
Potatoes.....	21.1	1.36	16.43	33,089
Beets.....	13.0	1.21	8.84	0.05	18,904
Mangel-wurzels.....	9.1	1.03	5.65	0.11	12,889
Turnips.....	9.5	0.81	6.46	0.11	13,986
Rutabagas.....	11.4	0.88	7.74	0.11	16,497
Carrots.....	11.4	0.81	7.83	0.22	16,999
Grains and other seeds:					
Corn (average of dent and flint).....	81.1	7.14	66.12	4.97	157,237
Kaffir-corn.....	87.5	5.78	53.58	1.33	116,022
Barley.....	89.1	8.69	64.83	1.60	143,499
Oats.....	89.0	9.25	48.34	4.18	124,757
Rye.....	88.4	9.12	69.73	1.36	152,400
Wheat (all varieties).....	89.5	10.23	69.21	1.68	154,848
Cottonseed (whole).....	89.7	11.08	33.13	18.44	160,047

DRY MATTER AND DIGESTIBLE FOOD INGREDIENTS IN 100 POUNDS
 OF FEEDING STUFFS—(Continued).

Feeding stuff.	Total dry matter.	Protein.	Carbohydrates.	Fat.	Fuel value.
	lbs.	lbs.	lbs.	lbs.	calories.
Mill products:					
Cornmeal.....	85.0	6.26	65.26	3.50	147,797
Corn-and-cobmeal.....	84.9	4.76	60.06	2.94	132,972
Oatmeal.....	92.1	11.53	52.06	5.93	143,302
Barley meal.....	88.1	7.36	62.88	1.96	138,918
Ground corn and oats, equal parts:..	88.1	7.01	61.20	3.87	143,202
Pea meal.....	89.5	16.77	51.78	0.65	130,246
Waste products:					
Gluten meal—					
Chicago.....	90.5	33.09	39.96	4.75	155,918
King.....	92.8	30.10	35.10	15.67	187,399
Cream gluten (recent analyses)...	90.4	30.45	45.36	2.47	151,420
Gluten feed (recent analyses).....	91.9	19.95	54.22	5.35	160,533
Buffalo (recent analyses).....	91.0	22.88	51.71	2.89	150,933
Rockford (Diamond).....	91.3	20.38	54.71	3.82	155,788
Hominy chops.....	88.9	8.43	61.01	7.06	158,952
Malt sprouts.....	89.8	18.72	43.50	1.16	120,624
Brewers' grains (wet).....	24.3	4.00	9.37	1.38	30,692
Brewers' grains (dried).....	92.0	19.04	31.79	6.03	119,990
Distill. grains(dried), principally corn	93.0	21.93	38.09	10.83	157,340
Distill. grains (dried), principally rye	93.2	10.38	42.48	6.38	125,243
Atlas gluten feed (distill. by-product)	92.6	23.33	35.64	11.88	159,818
Rye bran.....	88.2	11.47	52.40	1.79	126,352
Wheat bran, all analyses.....	88.5	12.01	41.23	2.87	111,138
Wheat middlings.....	84.0	12.79	53.15	3.40	136,996
Wheat shorts.....	88.2	12.22	49.98	3.83	131,855
Buckwheat bran.....	88.5	19.29	31.65	4.56	113,992
Buckwheat middlings.....	88.2	22.34	36.14	6.21	134,979
Cottonseed feed.....	92.0	9.65	38.57	3.37	103,911
Cottonseed meal.....	91.8	37.01	16.52	12.58	152,653
Linseed meal (old process).....	90.8	28.76	32.81	7.06	144,313
Linseed meal (new process).....	90.1	30.59	38.72	2.90	141,155
Sugar-beet pulp (fresh).....	10.1	0.63	7.12	14,415
Sugar-beet pulp (dry).....	93.6	6.80	65.49	134,459
Milk and its by-products:					
Whole milk.....	12.8	3.38	4.80	3.70	30,829
Skim milk, cream raised by setting..	9.6	3.10	4.61	0.90	13,139
Skim milk, cream raised by separator	9.4	3.01	5.10	0.30	16,351
Buttermilk.....	9.0	2.82	4.70	0.50	16,097
Whey.....	6.2	0.56	5.00	0.10	10,764

WHEN TO MARKET.

Some men say that it costs more to produce a pound of gain on a hog of large frame than on a close, compact, fine-boned animal. In pig or hog feeding the first step is to first establish a frame for the meat and fat that it is to carry. Breeders who attempt to create the upholstering before build-

ing the skeleton are putting the cart before the horse. Only one general rule can be given: When your hogs are ready, sell. Hogs that have been fed continuously from pignood should be sold just as soon as they reach the full bloom of finish, which will be at about eight or nine months of age, and weighing from 225 to 300 pounds. It is not profitable to continue feeding hogs that have been fed for a long period. Feeders must not forget that the finishing feed should be of short duration. Fall pigs that have been properly cared for and developed during the winter can be made to finish under a year of age weighing from 250 to 400 pounds, generally reaching a marketable age before extreme hot weather, say some time in June. Some feeders even carry such hogs for a longer period. If they have an abundance of forage and a limited supply of fattening feeds this method may be profitable.

Every breeder is familiar with the quick and easy-fattening qualities of thin brood sows and big-framed older hogs. Such hogs often gain 3 to 4 pounds daily and at a much lower cost than the average cost of pork. They should be finished out even and round, in which case they will be wide and broad of back and weigh from 400 to 700 pounds.

My aim is to develop frame first, feed to maturity and finish and then sell, regardless of market prices.

MARKETING.

The general practice is to sell to the country shippers, who collect, grade and ship hogs in car-

loads to the packing centers. More extensive breeders are in position to ship carloads of their own, or to secure additions from neighbors to make the required weight of a carload. In some localities it is more convenient and profitable to sell directly to local butchers. Many farmers kill hogs of their own raising and cure and sell the finished products to merchants or consumers in their own locality.

In marketing, the manner in which hogs are cared for prior to and during their journey to market is of importance. To owners who dispose of fat hogs to local shippers the following suggestions may be found of value: If the hogs are but a short distance from the scales, it will be better to drive them in the early cool of morning. In weighing hogs to buyers it is not honest to gorge or fill them just before weighing. Where the distance to scales is too great to warrant driving the hogs, hauling is necessary; the time to do this is in the cool of the day. The hog wagon should be prepared the night before. Air spaces should be made between the upper and lower bed, if an ordinary farm wagon is used. A hog-rack will oftentimes pay for itself in a single instance of use. Wet sand as a bedding keeps hogs cool enroute, although hay or straw well wet will answer the purpose. Should the sun be exceedingly warm, leafy limbs of trees or sacking may be spread over the top, and water thrown in at intervals will tend to maintain an even temperature among the hogs. Care should be taken to prevent fat hogs from getting into cramped po-

sitions. Many amateur shippers think that hogs should be filled at home or enroute to market. The main thing is to manage so that the hogs will have good appetites when they leave the cars at the market, as they will then get all the fill that it is possible to give them. So in feeding them prior to loading the feed should be of a light, dry nature. Many shippers have found that liberal allowances of charcoal or other gritty material with small amounts of salt or lime promote a condition in which the hogs ship well, and gives them a good appetite and thirst for water when they arrive at market.

In bedding a car for use in warm weather, sand is ideal bedding; it should be thoroughly wet before the hogs are placed in the car. Coal cinders or slack coal may be thrown in with the sand. In the winter wheat or rye straw or slightly soiled bedding from horse barns, millet hay, or mown forage are satisfactory for bedding. In no case is it advisable to use too much of any one kind of bedding.

In loading hogs in cars it is well to have them accustomed to the car nearly an hour before the train leaves. See to it that they are not switched about too much enroute.

FITTING SHOW HOGS.

No hard and fast rule can be given, but the selection of a candidate is of first importance. The intending exhibitor should be a good judge of individual merit. Hogs that are either hard or quick to mature or are ravenous or dainty feeders should be rejected. Hard-maturers generally are late in acquiring bloom, and are nearly always rough in quality and finish. Quick-maturers usually are stale, have an excess of fat, are wrinkled or creased, their feet and legs are out of line and they are undersized for their age at show time. Moreover, they almost invariably become unreliable breeders. Ravenous feeders gorge today and fast tomorrow. This makes firm, healthy, even fleshing impossible. Dainty feeders are difficult to get in show form.

Most of my winning show animals have come from matings that were planned largely for breeding purposes. I have found it difficult to secure many show animals from one litter; as a rule only one or two of exceptional merit occur in a litter. In selecting show animals family pedigrees are a guide, and if they show a line of good individuals of show merit a guarantee is given for the reappearance of individuals of as good or better merit.

Years of experience develops an instinct in a

breeder of show animals which enables him to select future winners. There is no greater pleasure for me than to analyze and compare the qualities of hogs from pigness to old age. When pigs are four to eight weeks old I examine them carefully. Day by day I study, pick to pieces this or that pig and make comparisons; in visits to other herds I carry mental portraits of my own hogs to compare with the best that I see in such collections. In this way I learn; I ascertain what I need, and long before the high-feeding time comes I have my aged, yearling, under-year and pig herds selected.

The individuals selected, care and feeding are next in importance. Show animals should never be allowed to become stunted. Sanitary care, wholesome feed and continuous development are the factors on which success largely depends. Separate the selected individuals from the herd and confine them where there is plenty of pasture and shade. There is no mystery about feeding show hogs. Any man who can put the finish on hogs for pork can finish hogs for show. Pigs intended for the six-months class should be fed, as soon as they begin eating, an abundance of muscle and bone-building feed until 30 days before showing. Then corn, shorts and milk should be used almost exclusively, with but little green feed. My practice for years has been as follows:

Before breakfast, water, followed by soaked corn. While I am at breakfast the pigs are out on alfalfa. After breakfast, a slop of shorts and bran, with

separator milk, is given, and all pigs are driven to the ends of the pastures. This will be about 7:30 a. m. As the day advances, the pigs will come back for shade, and at noon, water and soaked corn are given; then they are allowed to rest until the cool of the evening, when they are again given water and soaked corn. After I have had my supper they are slopped with shorts and bran with separator milk added or alone, as a "good night cap." All the feed they get should not be more than they will clean up; the idea is to underfeed just a trifle, and go around with the corn or slops two or three times each feeding time, giving a small quantity each time, especially after supper, until their appetites are appeased. They then have a soft bed to lie in for the night. Thus the processes of digestion and assimilation go on while they rest.

Oilmeal, blood or bonemeal or some other high-protein feed is sometimes mixed in the ration, as occasion may demand. Oats and oatmeal are also beneficial to use as a part of the ration, and barley-meal or soaked oats is an appetizing change, when they become tired of the usual diet.

As to older hogs, much the same practice is followed. If they have strong frames a finishing feed is given in small amounts but frequently, and plenty of exercise compelled so that the finish shall be laid on evenly. We are careful not to burn up the appetite on any one feed. If additional development is needed feeding for it is continued till there is just time to put on the finish, which for under-yearlings

can be done in about 60 days, and for yearlings 60 to 90 days. Hogs over two years old, if of good frames and easy feeders, generally take 60 to 90 days to acquire bloom. Boars as a rule are slower to finish than sows, and need more exercise in order that fat may be placed without creases or wrinkles.

Oilmeal helps to make a glossy live coat and an egg every day in slop aids in the same direction. Some men have difficulty in getting hogs to shed their old coats of hair. In such case get the hogs to growing and responding to feed; rub them daily with corncobs or a brush, rubbing in olive oil, lard and glycerine mixed with a little of some kind of parasite-killing preparation. Give them a good soap scrubbing at least once a week, followed with anointing with olive oil, lard, glycerine and a coaltar dip. After the scurf is removed, the hide in a healthy condition, and the frame and body are growing, nature will throw off the old coat and supply a new one. Creases and wrinkles can be rubbed out by the hands or with cobs, and by forcing considerable exercise.

To repel flies that attack the ears and nose apply fish oil mixed with crude oil or axle grease; apply daily.

In feeding, appetites, amount of feed consumed and digested and exercise taken should be studied by the feeder. One man should do the work. It takes a single mind properly to develop and feed show hogs.

Just how high the finish should be is hard to de-

cide, but wherever an extreme condition impairs any organ of the body, it is high time to remove the animal from the showring and such an individual should be disqualified by every judge. A hog show is not an all-pork show; fully one-half or more of it should be made up with breeding qualifications.

Breeders wishing to retain the fecundity of a show sow should breed her to farrow two or three weeks after the fair. This will also reduce her excess of fat and bring her into good breeding condition for a spring litter. Pigs from such sows generally are deficient in bone and vitality, and are often unprofitable to raise.

In feeding for showing build flesh with plenty of exercise, for firm flesh is the healthiest, the least detrimental to the hog and the easiest to take off.

EXHIBITING HOGS.

The wise exhibitor begins to exhibit at home. Long before the show opens he has accustomed his hogs to handling, taught them to recognize his voice, and made them so tractable that they can be handled with ease when they reach the exhibition grounds. A good finish should be obtained two weeks before the show, but the finishing touches in care and feed—the things that produce what may be termed bloom—should be given for a week or so before the trip to the show grounds. The idea being to arrive at the fair with “bloom” at about its fullness, so that it may improve instead of deteriorating. So a good hard finish should be given the hog previous to its leav-

ing home, and the last few days' feed should be approximated to that which will be given on the grounds. While at the exhibition warm cows' milk should be fed the hogs twice a day, as an appetizer and a stimulant to their general condition. Very little feeding, but plenty of water to avoid over-heating, is the rule to be observed in traveling to the grounds. Upon arrival, the pens should be given a bottom bed of clean sand, with a straw or hay top-bed. To minimize soreness from shipping, hogs should not be brushed or washed the first day, but allowed to rest and given a light thin short or bran slop, a light feed of corn, and a small dose of Epsom salts. The next morning the wet hay should be cleaned out of the pens, a stronger feed of corn given and the slops more like the home mixture, containing some milk. Each hog should now be washed, dried and rubbed with dressing, and then replaced in the clean, re-bedded pen. At noon a little water should be given, and at night light slops with corn and milk, amounting, however, to little more than half the home ration. The next day is generally show day, and the hogs should be given plenty of milk, a good fill of corn, a slop of creamy consistency containing milk, and a reserve supply of milk should be on hand for the hog to fill up on just before he enters the ring. This latter precaution not only gives a fullness in the flanks, but a full stomach makes the hog easier to handle. The hogs must be rubbed and given a slight re-dressing; have a man near all day with a brush.

In the ring the exhibitor should not pay any attention to the crowd, but should watch the judge, and have his animal in show shape every time the judge looks his way. Some judges make a point of catching the exhibitor off his guard, and while the hog is loafing, so to speak, they will catch a defect that they would not have seen if the exhibitor had been keeping the hog at attention. But this should not be overdone. The hog must not be kept on his feet and moving all the time. When the judge is down the line the hog should be given a few moments' rest. The exhibitor should answer any questions the judge asks but should not attempt to converse with him or tell him the hog's family history. While no attempt should be made to tell the judge his business or to point out the good qualities of the hog to him, it is equally unwise to speak or act in a manner that would emphasize the other points of the animal—the undesirable ones. Something depends on the showman as well as on the show hog.

A ribbon should be appreciated even if its color is not what one had looked for. In a strong class any ribbon is better than the first ribbon in a very poor class.

Attention has already been called to dressing before the exhibition. Many preparations are used for this purpose. For black breeds some showmen use dressings containing lampblack, but I think any such preparation quite inadvisable. A formula which I can recommend from many years' experience is the following, in which the proportions may be varied

according to the effect desired. For a gallon take:

Olive oil, $\frac{1}{4}$; pure linseed oil or machine oil, $\frac{1}{4}$; gasoline, $\frac{1}{4}$; coal oil, $\frac{1}{8}$; turpentine, $\frac{1}{8}$.

The gasoline makes this a very inflammable liquid, and care should therefore be taken to keep it away from all fires or lighted matches. The mixture may be applied with a brush or spray pump. It imparts a pleasing gloss to the hair and so heightens the effect of natural bloom.

THE HOG JUDGE.

The hog judge should have learned his business through actual breeding experience supplemented by thorough theoretical knowledge of the characteristics which breeding in certain directions produces. As a rule his position is not appreciated by the exhibitor who expects from him a greater infallibility than is altogether human. The strong judge is guided wholly by considerations of type, and in spite of the fact that many exhibitors gather friends around them in the hope that such demonstrations of popularity will influence the award of prizes, no judge worthy of the name will let either that, or the desire to distribute ribbons among as many exhibitors as possible, bend his judgment. The judge who carries a definite type-ideal clear through the show will not only gain in the end the confidence of the greatest number of breeders, but he helps to better the type, as his awards are really a comment on type that the breeder can assimilate and put into practice.

HOG HYGIENE.

To keep hogs in vigorous health is of prime importance. Disease in any form is a drawback that reduces profits. To prevent diseases and conserve health should be every breeder's constant aim. This requires that sanitary conditions shall be set up and maintained. It means that filth, bad drainage, open, wet houses and dusty sleeping quarters must be avoided. Keep an eye on the individuals in the herd; when ailments are detected apply treatment or consult a veterinarian. Charcoal, ashes, lime, turpentine and pine tar are among the old reliable remedies for minor troubles. In pigs the more common diseases can usually be checked by proper care and treatment. Most hog diseases spring from small causes. Success in removing causes depends largely on an intelligent, experienced caretaker's attention to lice, water and sanitary conditions. Cholera and tuberculosis are practically incurable. To prevent such diseases means the mastery of the art of sanitation. The Bureau of Animal Industry has probably solved the problem of preventing hog cholera by the serum treatment. No other treatment for this disease is worth trying. Pure water, sunlight, ventilation of hoghouses, exercise and rational feeding are the factors on which health depends. Dr. R. A.

Craig, Veterinarian at the Purdue University Experiment Station, Lafayette, Ind., has contributed the following on hog hygiene and the common diseases of hogs expressly for this work:

GENERAL SYMPTOMS OF DISEASE.

In order to recognize disease it is necessary to be acquainted with the functions and structure of the different organs of the body of the healthy animal. Stockmen have ample opportunity to study the appearance and habits of the animals in their care, and if they are careful observers should be able to determine the presence of disease by the changed appearance and behavior of the animal. These signs or symptoms that enable us to recognize disease may be classed as general, when the entire body is affected, and characteristic or direct when they characterize the nature of the diseased process. The general symptoms are especially important because they inform us as to the condition of the animal at the beginning and during the progress of the disease. These symptoms relate to the condition of the pulse, respirations, body temperature, visible mucous membranes, skin and coat, secretion from glands, urine and feces, and the nervous system.

The body temperature is a very important symptom, especially in infectious diseases. In this class of disease a feverish condition usually precedes all other symptoms, and when recognized enables

the stockman to use corrective and medicinal treatment sufficiently early to do good. The normal body temperature of hogs varies from 100.5° to 105.0° . The average is about 102.5° . Young hogs show a higher body temperature than do older animals. The common causes of extremely high or low normal temperatures are cold, draughty quarters, drinking cold slop, exercise and close quarters. Usually a body temperature above 104° may be considered abnormal.

Symptoms relating to the respiratory system may be considered next in importance to the body temperature. During rest the normal respirations vary from 10 to 20 per minute. If the hog has been exercised and is warm or excited the number of respirations per minute may vary from 60 to 100. In the different diseases of the air passages and lungs, nasal discharges, coughing, wheezing or other abnormal sounds and quickened, labored breathing form prominent symptoms.

A dry, hard, scurvy skin and a thin, rough, harsh coat commonly occur when the hog is unthrifty or affected with a chronic disease. In parasitic diseases of the skin its structure may be greatly changed.

Changes in the appearance of the mucous membranes lining the mouth, nose and eyelids are not considered as important in the recognition of disease in hogs, as they are in the larger animals. However, the appearance of these membranes should be

noted. In hog cholera and other serious febrile diseases the changed appearance of the eyes and the increased secretions from the lids form prominent symptoms. In digestive disorders the membrane lining the different parts of the mouth may appear soapy, dirty or ulcerated.

The body secretions and excretions may be greatly changed in certain diseases. These changes may be characteristic of the disease, as is the case of inflammation of the kidneys, bladder and intestines.

The condition of the nervous system is indicated by dullness, excitability or delirium. The hog may stagger, walk stiffly, drop the head or turn it to one side, walk in a circle, have convulsions or show a local or general paralysis of the body, as a result of a diseased condition of some part of the nervous system.

METHOD OF DOSING HOGS.

The most common method of giving medicine to hogs is with the feed or in the form of a drench. The more convenient method of the two is to mix the medicine with the feed fed the animal. This method may be objected to because of the possibility of each hog not securing the proper quantity of the drug or mixture, when a number of hogs are given treatment and the dose is small. This danger can be eliminated to a large degree by thoroughly mixing the medicine with the feed, separating the herd into small bunches and dosing each bunch separately.

If the drugs are soluble, milk or water should be used. If insoluble, they may be mixed with ground feed. In dosing young pigs we may take advantage of the fact that some drugs are excreted in the milk and administer them to the mother.

If the hog is too sick to eat or refuses to take the medicine in its feed, it is necessary to give it in a drench. This is not difficult if we go about it properly. It is advisable to handle sick hogs as quietly as possible, and avoid exercising or exciting them. In order to hold the hog a noose of sash cord or small rope may be placed around the upper jaw and well back toward the corners of the lips. When the hog pulls back the medicine can be readily thrown into the mouth with a syringe. The hog should be allowed to quiet down before giving the drench. It is not advisable to use a glass drenching bottle, as it may break and cut the mouth. A long-necked metal bottle, a funnel carrying about 2' of rubber tubing and nozzle, or a heavy-barreled metal syringe may be used in administering bulky drenches. Milk or water may be used as a vehicle for such drugs as go into solution readily, but for irritating and insoluble drugs, syrup and oil are best. In drenching a herd, if the treated hogs cannot be placed in a separate pen, they should be marked with paint or in some other way before allowing them to mix with the untreated animals.

Drugs may be administered by injecting them into the tissues beneath the skin. This method is

little used in hogs. It is indicated in special cases, when prompt energetic results are required. The place of injection should be in a region where the skin is thin and near or into the muscular tissues, otherwise absorption occurs very slowly. The hypodermic syringe and needle should be clean, the skin over the point of injection scrubbed with a disinfectant, and the drug used non-irritating in order to prevent the infection of the part with germs and the formation of an abscess.

Rectal injections or enemas are useful in the treatment of intestinal disorders in hogs. In giving an enema it is best to use some form of a fountain syringe. A cheap and convenient syringe for this purpose is a funnel carrying 2' or 3' of rubber tubing with a wooden nozzle attached. It may be advisable to elevate the hind parts and remove the feces from the rectum before administering the injection. To avoid irritating the rectum the nozzle of the syringe should be smeared with vaseline. Two quarts or more of water may be slowly injected into the intestinal tract of a grown hog

DISEASES OF THE DIGESTIVE TRACT.

Sore Mouth.—Inflammation of the mouth is commonly met with in young pigs. The infectious or ulcerative form is more common and of greater economic importance than the simple form. The latter inflammation is perhaps more common than we are aware of, as a hog having a slight soreness

of the mouth may not develop noticeable symptoms and the condition is not recognized. A simple inflammation of the lining membrane of the mouth is directly due to insanitary conditions and mechanical irritation. The ulcerative inflammation is caused by a specific germ, but filth and mechanical irritation are important secondary causes. Age is an important predisposing factor, as this latter form of the disease is commonly met with in pigs under two months of age. The mechanical causes of inflammation of the mouth are eruption of the teeth, sharp teeth, feeds containing barley or wheat beards and wire or rope loops used in holding hogs. Wounds or injuries to the mouth parts facilitate the entrance of germs into the tissues. The drinking of water from foul wallows, which receive the drainage from filthy hog-lots, and the feeding of putrid decomposed slops are important causes. Such feeds contain irritating germs that may produce inflammation and ulceration, especially if the hog is unthrifty or the lining membrane of the mouth broken or abraded.

The bacillus that produces ulcerative sore mouth in pigs is said to be widely distributed. This disease is highly contagious. The infectious agent is distributed in the usual way through the dust and filth from infected yards, and by pigs affected with the disease. When introduced into a herd it spreads rapidly from litter to litter, unless careful preventive measures are resorted to early in the outbreak.

Filth, sharp teeth and irritation to the gums from the eruption of the teeth are important predisposing factors in the production of this disease. The early symptoms of the inflammation usually escape notice, and it is not until the pig shows difficulty in nursing or eating that the condition is recognized. Large hogs may champ the jaws and endeavor to relieve the pain by running the snout into cold water. Saliva may dribble from the mouth. They usually stay on feed, but prefer slops. If corn is fed there is difficulty in chewing it, and a large part drops from the mouth. In ulcerative sore mouth the ulcers form the characteristic symptoms. In the early stage of the disease inflamed patches, deep red in color, are found on the gums and inside of the lips. Later these parts become whitish or yellowish-white in color with inflamed thickened margins. This dead tissue soon sloughs away and deep ulcers form. The sloughing tissue may involve several teeth, or a large portion of the lips and snout. Ulcers may form on the face, and the snout and lips become so badly swollen as to interfere with breathing. In the advanced stage of the disease the pig refuses to nurse, and becomes dull and weak. It is only in young pigs and in the infectious form of the disease that death commonly occurs.

The treatment is largely preventive. Irritating feeds such as putrid slops, hot feeds and grains containing beards should not be fed to hogs. They should not be allowed access to filthy drinking

places and feeding floors, not so much because of the irritating effects on the mouth, but the injury that may result to other parts of the digestive apparatus. The mouth may be washed daily with a 4 per cent water solution of boric acid or powdered alum. Plenty of the solution should be used, and it is best to apply the wash with a syringe. Soft feeds should be fed.

In the infectious form of this disease the two lines of preventive treatment consist in keeping the hoghouses and yards in a sanitary condition, and using all possible precautions against the introduction of the disease into the herd. If the disease breaks out in a litter the mother and the pigs should be completely separated from the herd. The pens should be disinfected and all litter removed. The mouths of the pigs should be examined daily, and advanced cases treated by cleaning and scraping the ulcerated parts, and then rubbing the surface of the ulcer with lunar caustic. The pigs may be treated by dipping them head foremost twice a day into a disinfecting wash. It is better, however, to inject the wash directly into the mouth with a syringe. A 2 per cent water solution of a reliable tar disinfectant may be used. A one-half teaspoonful of permanganate of potash crystals dissolved in about one gallon of water is an effective wash, which many breeders employ with good results.

It is usually more economical to kill the badly-diseased pigs than to treat them, as they are apt to

spread the infection and usually either die or become badly stunted.

Diarrhoea and Scours.—Diarrhoeal discharges from the intestines form a common symptom of irritated and inflamed conditions of the lining membrane of the stomach and intestines. This disorder is usually the result of a faulty diet and insanitary surroundings. Age is a predisposing factor. As is the case in other species, diarrhoea is quite common among young litters. Pigs a few days or a few weeks old may develop a diarrhoea, and at times it may take on the form of an infectious or contagious disease. Changes in the mother's milk resulting from a feverish condition, or faulty diet, such as sudden changes in the feed, fermented slops and mouldy corn, are common causes of scours in pigs. Insanitary conditions, such as poorly-lighted and ventilated, filthy, damp pens and houses that interfere with the general health of the young, may produce unthriftiness, digestive disturbances and scours.

Sudden changes in the ration, especially to succulent green feed and from a light to a heavy ration, are common causes of indigestion and diarrhoea in hogs. Eating a large quantity of feed in a short time may also cause it. Hogs fed in filthy pens may become affected with an inflammation of the stomach and intestines caused by the irritating, disease-producing organisms present in the filth that enters the digestive tract with the feed. Wash waters con-

taining washing powders, salt and lime are frequently mixed with the house slops, and when fed greatly irritate the lining membrane of the stomach and intestines. Diarrhoea is a prominent symptom of hog cholera.

As a result of the irritated condition of the intestinal tract, the secretions from the intestinal glands are interfered with or abnormal and the feed is improperly digested. This condition produces changes in the intestinal excreta, and it becomes thin and foul-smelling. If the irritation to the intestines is severe, there is evidence of abdominal pain, the animal refuses feed and is feverish and dull. In case the diarrhoeal discharges persist for several days, weakness is a prominent symptom, the hind parts and tail become badly soiled and the discharges become more watery and foul-smelling than at first. The severe form of the disease commonly ends in the death of the animal, especially pigs. This class of disease is largely due to unhygienic conditions and a faulty diet; hence preventive measures are of more importance than medicinal treatment. The opinion that hogs can eat any kind of spoiled feed and live in filth without suffering injury is too common.

At the time of farrowing the sow should be kept in the best possible physical condition. Exercise, pure air and sunshine are essential to the health of young pigs. The house or pen should be clean and dry. If the mother is feverish she should be fed a

light diet and given a physic in order to correct her condition. If the pigs show evidence of scouring, tincture of opium in from one to two teaspoonful-doses may be given the mother two or three times a day. Pigs several weeks old should be treated by drenching with from one-half to one tablespoonful of olive oil, followed in six or eight hours by a few drops of tincture of opium twice daily for a few days, if necessary.

Older hogs should be taken off feed for at least one day, and given a physic of castor oil, from one to four ounces. If the diarrhoea persists the following mixture may be given in from one-half to one teaspoonful-doses in a milk drench three times a day: Bismuth subnitrate, $\frac{1}{4}$ ounce; salol, $\frac{1}{4}$ ounce, and bicarbonate of soda, 1 ounce.

DISEASES OF THE RESPIRATORY ORGANS.

Bronchitis.—This is a common disease of young growing hogs. Usually the inflammation of the bronchial mucous membrane is mild, and it is only in severe forms of the disease that it becomes of economic importance. It is frequently associated with sore throat and cold in the head. Two common causes for the disease in pigs are dusty quarters and lungworms. In addition to the mechanical irritation produced by the inhalation of dust, disease-producing germs present in the dust may cause a serious inflammation of the irritated parts. Exposure to cold, especially if the hog is overheated, or

wet with snow or rain, may result in the animal taking cold. This frequently occurs during the fall and winter, when hogs are allowed to pile up in small, poorly-ventilated sleeping quarters or around strawstacks and manure heaps. When hogs are allowed to sleep in such places they partially bury themselves in the litter, or are covered by the bodies of the animals on the outside of the pile. This results in overheating. Under such conditions the body becomes covered with moisture and chilling occurs. The air that the animal breathes becomes charged with foul odors and poisonous gases and dust emanating from the bodies of the hogs, the surrounding filth and the air given off from the lungs. It is under such conditions that the most serious forms of bronchitis develop. What to do to prevent future attacks is therefore perfectly obvious.

In the mild form of bronchitis the only noticeable symptom is a cough. These coughing spells usually occur shortly after the animal leaves its bed or after exercise. In the severe form of the disease the symptoms are marked. These are fever, quickened breathing, coughing, depression and loss of appetite. Violent coughing spells accompanied by discharge of mucus from the mouth occur. If sore throat and cold in the head occur as complications of the disease, there is a discharge from the nose. The acute symptoms, such as high body temperature and quickened breathing, last but a few days. Unthriftiness and paroxysms of coughing are charac-

teristic of the chronic form of the disease. It may terminate in pneumonia.

The feeding of a well-balanced ration and good care are the lines of treatment indicated in this disease. The preventive treatment consists in avoiding such conditions as may cause irritation of the lining membrane of the air passages. Because of the habits of hogs, their inclination to pile up when large numbers are allowed to sleep in uncomfortable, small quarters, and the manner in which they burrow into litter around strawstacks and manure heaps, and breathe in the dust from dirty floors, it is of greater importance to provide them with proper sleeping quarters than any of the other farm animals. That is, hogs suffer more from insanitary sleeping quarters than other animals. This is especially true of growing pigs.

Pigs rapidly recover from the mild form of bronchitis, if fed a nourishing, well-balanced ration and given good care. In the more serious form of the disease it is best to feed a light diet during the acute stage and give a physic. Castor oil in from one-half to two-ounce doses may be given. In addition to this treatment the animal may be allowed to inhale steam. This greatly relieves the inflamed, irritated condition of the respiratory membranes. The following method may be practiced: A vessel containing a one-half per cent boiling hot water solution of turpentine, or tar disinfectant, is held within a few inches of the hog's nostrils and the ani-

mal allowed to inhale the medicated steam for about 10 minutes three or four times a day. It is advisable to throw a light cloth over the pan and head in order to direct the steam toward the hog's nostrils. This treatment is of course practical for individual cases only.

Congestion and Inflammation of the Lungs.—Congestion or engorgement of the lungs is more common than pneumonia in hogs. Inflammation of small areas of lung tissue or a lobular pneumonia is common in young hogs. This occurs as a complication of bronchitis. Inflamed conditions of the lungs and pleural membrane are commonly met with in such specific diseases as hog cholera and infectious pleuro-pneumonia.

The same insanitary conditions mentioned as factors in the production of bronchitis may be included among the causes of lung diseases. Young, pampered hogs and fat hogs because of their high condition are predisposed to engorgement of the lungs, and when given exercises to which they are not accustomed frequently develop this disorder. Any condition that leads to chilling of the body may produce pneumonia or pleurisy. Moving pampered hogs from warm comfortable quarters to cold, draughty pens; washing and dipping hogs during the cold weather, unless special precautions are used; sudden changes from a warm to a cold climate during the cold months of the year; and exposure in stock cars during severe cold weather are common causes of this class of disorders.

The symptoms occurring in engorgement of the lungs are acute in character. Immediately after the hog has been exercised or handled it appears greatly exhausted. The visible mucous membranes are deep red in color, the breathing is labored and the body temperature elevated. Death may occur within a few hours. The early symptoms of pneumonia resemble those occurring in engorgement of the lungs, but are more mild. The character of the breathing is changed. Quickened, labored respirations may be met with in severe cases. Abnormal lung sounds may be heard in the diseased portions by placing the ear against the wall of the chest. The early stage is characterized by crackling sounds; later these become deadened as a result of the air cells becoming filled with the inflammatory exudate. When these exudates become broken down fluid rattling sounds are heard. Over the healthy areas of lung tissue the respiratory sounds are louder than normal. If the pleural membrane is inflamed during the early stage of the inflammation friction sounds occur and the hog shows marked evidence of pain when pressure is applied to the chest wall. The course of the disease is from one to three weeks.

The preventive treatment consists in avoiding such conditions as may predispose the animal to this class of disease or act in any way as an exciting cause. In an engorgement of the lungs the treatment indicated is to keep the animal quiet and as comfortable as possible. In severe cases treatment of any kind is of little use. Good quarters and care-

ful nursing are highly important in the treatment of pneumonia. As the sick hog can use but a part of its lungs the pen should be well ventilated, clean, free from dust, odors and draughts. In severe cold weather the animal must be protected from the cold by covering it with a blanket or by artificial heat. A light diet should be fed, and the animal given a mild physic. This may be repeated, if the animal is constipated. The medicinal treatment is of little importance. During the early stage of the disease and after recovery begins the following mixture may be given: Alcohol, 6 ounces; and quinine $\frac{1}{2}$ ounce. The dose is from one-half to one tablespoonful, repeated three or four times a day. A liniment of turpentine 10 parts and croton oil 1 part may be applied to the chest wall.

DISEASES OF THE NERVOUS ORGANS.

Thumps.—This is a very common ailment of pigs. The exciting causes of the disease are lack of exercise and irritation to the stomach and intestines resulting from irritating feed, overeating and changes in the diet. This irritation to the gastric and intestinal nerves results in secondary irritation to the nerves that go to the diaphragm, and spasmodic contractions of this muscle occur. Short, jerky contractions of the flank muscle are the principal evidence of this condition. Young pigs lose flesh rapidly. Older pigs become unthrifty and stunted. The short, jerky breathing in lobular pneumonia is sometimes mistaken for the thumps.

The treatment is both preventive and curative. The preventive treatment in young pigs consists in feeding the mother a proper diet and giving the pigs good care and plenty of exercise. Growing pigs should be fed a ration that meets the needs of the system, and allowed plenty of exercise. After the disease develops exercise and a light diet are indicated. Young pigs may be exercised by turning the mother into a large lot or placing the litter in a box or pen away from the mother. It is also advisable to physic the pigs. In severe cases, 3 to 15 drops of tincture of opium may be given three times a day until the spasms are relieved. If the pig is unthrifty and has indigestion saline and bitter tonics may be given in the feed.

Paralysis of the Posterior Part of the Body.—The loss of control over the movement of the hind parts is usually attributed to a diseased condition of the spinal cord. Local inflammation of the spinal cord and its membranes may result from injuries such as blows, kicks, becoming crowded in doorways and piling up in pens. It is not uncommon for young hogs that are fed and handled in such a way as to expose them to such injuries to become paralyzed in their hind parts. Pressure on the cord from tumors and encysted parasites may also cause this disease. It is said that when pigs are fed a ration that does not meet the needs of the system their bones become fragile and easily broken. Such animals may suffer from fracture of both thigh bones. The symptoms resulting from this condition resemble

that resulting from injury to the cord. Sows that have suckled large litters of pigs and are in a poor physical condition may develop a paralysis of the hind parts. However, this usually terminates in a general paralysis. This condition seems to be due to poor care and the feeding of an improper ration. It is most common during the late winter and spring.

In the large majority of cases this disease can be prevented. Pigs should not be handled in such a way as to predispose them to injury. Fracture of the thigh bones as a result of a rachitic condition may be mistaken for a paralysis of the hind limbs, hence it is advisable to mention with other preventive measures the feeding of a proper ration and the necessity of exercise. As soon as the symptoms develop the animal should be separated from the rest of the litter or herd and given a separate pen. A light diet should be fed. As constipation is a prominent symptom in this disease the bowels should be kept loose by giving physics of oil or Epsom salts. If necessary this may be supplemented by a rectal injection of glycerine and water in the proportion of about one teaspoonful to the quart. The most useful drug for the relief of paralysis is *nux vomica*. From 5 to 15 drops of the tincture may be given three times a day. The animal must be kept quiet and after becoming able to use its hind parts it should be kept away from the other hogs until a complete recovery has occurred. This may require a considerable period of time.

Heat-Stroke.—Hogs that are crowded into close quarters or exercised during the hot months often suffer from heat-stroke. The crowding together or exercising of hogs during extremely hot weather results in the accumulation of the body heat, an extremely high body temperature and a derangement of the heat-regulating centers. Exhaustion occurs, followed by collapse, unconsciousness and death in the severe form of the disease. Treatment largely is preventive. During extremely hot weather fat hogs that are not used to exercise should not be crowded together or handled during the hot part of the day. An occasional sprinkling of the pen and hogs with cold water helps greatly in keeping them cool. Shades should be built in hog-lots and pastures where there are no trees.

When a hog shows evidence of heat exhaustion it should be moved to a cool shady place, the head and neck wet with water and gradually the entire body. Tincture of nux vomica may be given in from 5 to 15-drop doses every two or three hours until the animal shows evidence of recovery.

DISEASES OF THE REPRODUCTIVE ORGANS.

Impotency of the male and barrenness of the female are more common among the large farm animals than among hogs. These conditions are more common among breeding hogs that have been fitted for fairs and stock shows than among stock hogs. The most common causes of impotency and barrenness are lack of exercise, the feeding of an im-

proper ration or one that tends to produce fat and old age. Too free use of the male in service may result in his failing to get but a small per cent of the sows with pig. This is especially true of young boars. Injuries to the penis at the time of service often result in the animal becoming impotent. A very common cause of sterility in females is leucorrhoea. In this disease the abnormal secretions that form and collect in the womb and maternal passages leading to it destroy the fertilizing elements in the seminal fluid, hence impregnation cannot occur. Sometimes the entrance into the womb is closed by fatty or scar tissue and the seminal fluid does not enter the organ. Diseased conditions of the ovaries and testicles, lack of development of the maternal organs and old age are causes of failure to breed in both sexes.

Breeding hogs should not be pampered or confined in small pens. In order to keep them in a good physical condition they should not be fed a ration high in fat-producing ingredients. Exercise is an essential part of the care and should not be overlooked. Too free use of the male should be avoided at all times. Young breeding animals that are sterile because of their fat, pampered condition can very often be induced to breed by cutting down the ration and allowing plenty of exercise. When the sow does not come in heat properly, or the male does not act as freely as he should, a stimulating ration should be fed and plenty of exercise given. If the essential structure of the testicles or ovaries is destroyed it

is impossible to relieve the sterility. In such cases it is a waste of time to experiment.

Leucorrhoea is frequently met with in sows. It is usually present in sows that have aborted or have suffered from inflammation of the womb following the birth of young. Usually a noticeable discharge occurs and the sow may show marked evidence of unthriftiness. The treatment of this disease consists in irrigating the maternal passages with an antiseptic wash. This may be injected with a fountain syringe, and about one quart of the wash used. The better grade of coaltar disinfectants may be used in about $\frac{1}{2}$ per cent solutions. This treatment should be used daily for two or three weeks. In slight cases irrigating the maternal passages with an alkaline wash (about one teaspoonful of bicarbonate of soda in about one-half gallon of water) one hour before breeding the sow may relieve the condition.

CARE OF PREGNANT SOWS.

There is no special time during the period of pregnancy in which to practice special lines of caring for sows. Although attention to the physical condition of the sow is of the greatest importance during the latter period of pregnancy or within two or three weeks of birth, special lines of hygiene, feeding and care must be practiced throughout the period. This is necessary in order to insure an easy and normal birth, relieve the irritable, feverish condition so common at this time, and put the sow in

proper physical condition to secrete plenty of good wholesome milk. It is more difficult to keep an animal in good physical condition when she is pregnant than at any other time. Animals in this condition show a tendency to put on fat, a most fatal condition to a normal birth, especially in young sows. Careless handling results in injury to the sow and death of the foetus. Large herds and small sleeping quarters where the hogs pile up, crowding through holes in the fence, becoming crowded in doorways and at the feed trough, and injuries received when allowed to run with other animals, are to be avoided. The ration fed must contain the necessary elements to meet the needs of the developing foetus and keep the sow in a proper physical condition. Exercise is essential. Insufficient exercise leads to a diseased condition of the pregnant animal, and is the most common cause of complications occurring toward and at the end of the pregnant period. When the time of birth approaches it is advisable under the conditions present in most herds to give the sow separate quarters, where there is no danger of injury to herself or the newly-born pigs, and the necessary help and attention can be given. Dieting the sow at the time of parturition is a very important part of her care.

ATTENTION AT BIRTH.

A normal birth occurs when no outside assistance or interference is necessary, and the young is sufficiently developed to live outside of the mother.

Because of the artificial conditions of feeding, breeding and care that the sow is subjected to birth or the act of parturition is often difficult and complicated. If this is the case it becomes necessary to offer assistance in order to save the life of the mother and young. In giving intelligent assistance at this time practical experience and good judgment are necessary. Obstetrical forceps, small blunt hooks with long shanks, cords and the like must be used intelligently. The help or interference should not be offered too early or before it is necessary and we should handle the sow quietly so as not to cause her unnecessary irritation. In young sows it is more difficult to make a complete examination and determine the condition of the parts than it is in old sows. One of the first conditions noted is the dry, congested condition of the maternal passages. If the act of birth has been greatly prolonged this is very marked. In such cases the pig is dead, sometimes greatly swollen and well back toward the entrance into the pelvic cavity. The dry, congested passages should be lubricated by injections of warm soapy water or olive or linseed oil. It may be advisable to use a large swab that has been dipped in oil and repel or shove the pig forward. This will greatly facilitate its removal, and very often no further interference is necessary.

Immediately after a difficult birth the womb and maternal passages leading to it should be irrigated with a 1 per cent warm water solution of a reliable

disinfectant. In case the parts are badly irritated and inflamed, and a discharge occurs, the irrigation of the parts should be repeated daily, using a $\frac{1}{2}$ per cent water solution of the disinfectant until the unhealthy condition is relieved. In addition to the irrigation of the parts it is advisable to give the sow a physic after the birth of the litter and feed her a light diet for a few days.

The infectious diseases most common in hogs are hog cholera and tuberculosis. Hog cholera causes an enormous loss yearly and is a menace to the swine industry in this country. Tuberculosis is more important in some localities than hog cholera, and is increasing from year to year. This fact is not evident to the stockmen, as the symptoms of this disease are not of an acute character, the progress is slow and little evidence of the diseased condition is shown until it has reached the latter stages and has become generalized. Septicaemia hemorrhagica should be mentioned among the other hogyard infections. Scattered cases of this disease occur and the yearly loss from it is by no means small.

The more dense the hog population and the greater the traffic in hogs the greater the loss from this class of disease. Acute infectious disease is more prevalent among hogs than among other classes of live stock. This condition indicates and emphasizes the fact that hogs are kept under more insanitary conditions than other farm animals. Insanitary conditions are secondary factors in the production of germ diseases. Filth favors the spread

and propagation of infectious organisms. Hog cholera, tuberculosis and septicaemia hemorrhagica are produced by specific organisms, but these different organisms cannot develop from filth alone. They may live for a longer time outside of the animal body under such conditions, but the specific germ must first be introduced into the yards and houses before it can infect healthy herds. It is in this way that diseases spread.

Disease-producing germs enter the body with the feed and water taken into the digestive tract, the air breathed into the lungs and through wounds. From the digestive and respiratory tracts and surface of wounds they may enter the tissues and produce lesions of disease. Infection is more apt to spread rapidly and become permanent in overcrowded hoghouses and yards than in roomy hoghouses and pastures that allow the animals plenty of range, because of the close contact between them and the insanitary surroundings usually present under such conditions. Feeding in the mud or on filthy feeding floors, and a water supply coming from ponds and streams, are common sources of disease. Streams running through an infected section may distribute the disease to all hoglots bordering on its banks. The smaller the stream the greater the danger of its spreading disease.

Hogs exhibited at fairs and shows frequently become diseased as a result of exposure to infection in the pens and cars. Buying hogs from diseased herds or shipping them in infected cars and unload-

ing in public stockyards are common sources of hog cholera infection.

The most important factor in the production of tuberculosis in hogs is the presence of the disease among dairy cattle. Milk from a single herd of tubercular cattle, when taken to the creamery, may infect a large number of hogs in a neighborhood through the skimmilk, buttermilk and slop fed them. This fact has been proved by the greater prevalence of tuberculosis among hogs fed these by-products. Another source of infection occurs when hogs are allowed to follow tubercular cattle and feed on the feces. Young hogs are more susceptible to germ diseases than old animals. This susceptibility toward disease may be increased by close pens, filthy, dusty sleeping quarters, the feeding of an improper ration and unnatural bringing up. Such conditions act unfavorably on the constitution of the pig and cause it to lose vigor and become unthrifty.

CONTROL OF INFECTIOUS DISEASES.

Hygienic Measures.—An important measure for the prevention of infectious diseases in hogs is the feeding of clean feed and water from clean feeding floors and troughs. Small streams running through the hog pasture or yards that receive drainage from other yards are a frequent source of infection. Yards bordering on a public highway are exposed to infection because of the practice of hauling sick hogs to market. It is therefore not advisable for the hoglots and houses to border on streams or main

traveled roads. Hopyards should be well-drained and kept free from litter, manure heaps and wallow holes. Overcrowding should be avoided. It is advisable to remove the hogs from part of the lots for a few months in the year, plow them and if possible plant to forage crops. This helps greatly in keeping them in a sanitary condition.

There is no place on the farm where there is as great need of frequent cleaning and disinfecting as in hoghouses and yards. Whitewash, lime, chloride of lime and stock dips are the common disinfectants used. Whitewash is most effective when applied with a spray pump, as the rough surfaces and cracks can be well covered and filled in. Chloride of lime may be used in the proportion of 6 ounces to the gallon of water. The tar disinfectants should be used in from 2 to 4 per cent water solutions.

Police Measures.—In most states very little effort is being made toward the enactment and enforcement of sanitary laws controlling infectious diseases of hogs. This neglect is costing stockmen several million dollars annually. All possible precautions against the introduction of infectious material or an infected animal into the herd should be taken. Hogs coming from other herds or stock shows should be excluded from the herd until they have been proved free from disease. They should be quarantined in pens set off for this purpose. The quarantine pens should not communicate in any way with the regular yards. Cleaning hogs by dipping or washing them with a water solution of a reliable

disinfectant before bringing them into the herd prevents any possibility of the infection being carried in the dust and dirt on their bodies. Persons caring for infected animals should observe the necessary precautions against the distribution of the disease.

As tubercular cattle may communicate the disease to hogs measures should be taken against infection from this source. The presence of this disease in cattle can be determined by the use of the tuberculin test. Tubercular dairy herds should be tested, and the diseased animals cared for in such a way as to eliminate all danger of the infection spreading. Skimmilk and buttermilk from a creamery should be properly pasteurized before feeding to hogs. Hogs known to have tuberculosis should be destroyed and their carcasses cremated. If a large percentage of the animals in the herd are found infected the entire herd should be disposed of. In case the herd is particularly valuable the tuberculin test should be made, and the diseased hogs destroyed. After freeing the herd of the disease new yards should be built, as it is impossible to clean up the old yards and eliminate all danger of infection.

TREATMENT OF CHOLERA HERD.

When an outbreak of hog cholera occurs on a farm the herd should be quarantined and all possible precautions taken against the spread of the infection in the neighborhood. The separation of the herd into small bunches of about a dozen ani-

mals is sometimes practiced. This is not advisable, as the work of caring for the animals is greatly increased and infection scattered over a wide area, proportionately increasing the opportunity for infecting neighboring farms.

If the houses and yards are well-arranged and can be cleaned and disinfected it is not advisable to move the animals, but if the quarters are old and more or less tumbled down, and the yards littered with corncobs, manure piles and strawstacks, it is advisable to provide better quarters. Such yards should be well-drained. During the warm months of the year plenty of range and protection from the sun and rain are necessary. A recently-mowed meadow or a bluegrass pasture and a low shed open on all sides and amply large for the herd to lie under, give the animals a clean range and comfortable, cool quarters. Roomy, dry, well-ventilated sleeping quarters and yards that have good surface drainage are best when the weather is cool and wet. In most outbreaks it is advisable to separate the sick from the well hogs. Early in the outbreak and in the subacute form this is practical.

A very light ration consisting of a thin slop of shorts or other ground feed should be fed. Powdered copper sulphate may be given in the feed and drinking water. For convenience of mixing with the feed, 8 ounces of the powdered drug may be dissolved in one gallon of warm water and one pint of the solution added to each 10 gallons of slop and water fed. This method of feeding should be used as soon

as symptoms of disease are noticed and continued for a time after recovery. The entire herd should be dieted and made to clean up their feed quickly. Water and slop should not be left in the troughs for the hogs to wallow in, and the troughs should be disinfected and turned bottom side up as soon as the hogs have finished feeding and drinking.

A disinfectant should be sprayed or sprinkled daily about the feed troughs, floors and sleeping quarters. The care and treatment of the herd require work and close attention to details on the part of the attendant. Indifferent, careless treatment is of no use in this disease.

Dead hogs should be burned. This is not a difficult task if the bodies are placed on top of a pile of wood that burns quickly and makes a hot fire. If the body is disposed of by burying it should be covered with a few inches of lime. At the end of the outbreak everything should be cleaned and disinfected. After a few weeks the yards should be plowed. If the herd has been moved from old to new quarters it is of course unnecessary to wait until the end of the outbreak before giving the old quarters a thorough cleaning and disinfecting.

Hog Cholera Serum.—The medicinal treatment of infected herds has proved unsatisfactory or a failure, and many of the commercial “hog cholera cures,” “antitoxins” and “vaccines” that the farmer has spent his money for and thereby increased his personal losses may be classed as “fakes.” For years investigators have endeavored to pro-

duce a successful serum and vaccine for the treatment and prevention of cholera. The credit of developing the first and at present only successful hog cholera serum and method of vaccination belongs to Drs. Dorset and Niles.

The hog is the only animal available for the production of a protective cholera serum. The virulent material used in producing the hog or the hyper-immune from which the anti-hog cholera serum is secured is hog cholera blood. This blood must be very virulent or from a hog that has acute cholera. If not highly virulent the serum is lacking in potency or protective properties, and when used in the field may result in heavy losses among the vaccinated herds. After the hog has recovered from the injection of virulent blood it is bled by cutting off the end of the tail. From two to four tail bleedings at intervals of one week are made, when the hog is re-injected with cholera blood. The tail bleedings and re-inforcements with cholera blood are repeated until the tail has become so short that it cannot be handled, when the animal is killed and the final bleeding made.

Anti-hog cholera serum may be used with cholera blood as a vaccine, or for the purpose of preventing further development of the disease in recently-infected herds. It is advisable before vaccinating hogs to take the body temperature in order to determine whether the animal is infected or not, as this symptom may occur several days before visible symptoms of disease are manifested. If the body

temperature is normal, cholera blood and serum are used, or the serum-simultaneous method of vaccination is practiced. If the body temperature is above normal, serum alone is used. Infected and sick hogs require larger doses than do the non-infected animals.

PARASITES OF SWINE.

Animal parasites of hogs may be classed as external and internal. The hog louse is the only common external parasite. The common internal parasites are lung and kidneyworms, and the several different species of intestinal worms. The hog louse is larger than any of the other species of lice found on domestic animals. Its mouth parts are adapted for puncturing the skin, and it feeds on the secretions and blood that result from the irritation and puncture. It has well-developed foot parts that enable it to cling to the hair, but the thin coat of the hog offers little protection to the lice. They are rubbed or scratched off in large numbers and infest the yards and beds.

The lungworm is the most common of the internal parasites. It is usually found in the small bronchial tubes, especially near the margins of the lungs. Its length varies from one to one and one-half inches, and in appearance it is white and thread-like.

The most common of the intestinal parasites is the common roundworm. This worm is found in the small intestines and when present in large num-

bers may form twisted elongated masses that fill the lumen of the intestinal canal. It is yellowish-white in color, from 6" to 10" long and tapering toward the extremities. After a hog is killed or dies from disease these worms may migrate from the small gut to the stomach and on into the gullet. Sometimes they burrow into the liver. During the life of the hog the only organ that they may invade, other than the intestine, is the bile duct.

The thorn-headed worm is the most dangerous of all intestinal parasites. It can be recognized by the thorn or proboscis present at its anterior extremity. The parasite attaches itself to the intestinal wall by imbedding its proboscis in the lining membrane of the canal. This produces severe irritation and inflammation at the point of attachment, and, if a large number are present, results in unthriftiness and nervous disturbance.

The whip and pinworms are found in the large intestine, and probably do very little harm.

The kidneyworm is found in the fat around the kidney, in the kidney and sometimes in the abdominal cavity. This parasite does not seem to cause any marked diseased changes of the part, unless a large number of parasites are present.

The animal parasites that do the least harm usually have a simple life history. When there are several different stages in the development of the parasite and one or more intermediate hosts are required there is a better opportunity to destroy them. If the outside conditions are such as to en-

able the eggs or larvae to live for a long time parasitic diseases are more prevalent. Wet years, muddy yards, undrained pastures and ponds are favorable conditions for the development of this class of disease. Dirty drinking troughs, filthy feeding floors, and pastures and yards that have been in use for years, are common sources of infection.

Unthriftiness predisposes hogs to invasion from large numbers of parasites. Healthy, vigorous, young hogs seldom suffer seriously from lice or intestinal worms. Age is also an important predisposing factor, and as is the case in other species parasitic diseases are most common in young, immature animals. In young or unthrifty hogs lice are a serious menace and marked symptoms of lousiness occur. The irritation resulting from the bites of the lice make it almost impossible for the animal to rest. This together with the loss of the blood that is sucked up by the parasites results in marked interference in general nutrition, and the hog becomes thin and weak.

Unless there is a large number of roundworms present in the intestines no marked symptoms of disease occur. If present in large numbers the common roundworm may obstruct the intestine and irritate the lining membrane, causing it to become inflamed. Sometimes the inflammation extends to the bile duct or the parasite may work into the duct and the flow of bile is obstructed. The symptoms resulting from intestinal worms are very much the same as in chronic indigestion. The

thorn-headed worm, when present in large numbers, may produce nervous symptoms, such as marked restlessness, convulsions and spasms. Death may occur.

The kidneyworm is supposed to cause a paralysis of the hind parts. There is no relation between this disease and the kidneyworm.

The lungworm seldom causes symptoms of disease in thrifty, well-cared-for pigs. In serious cases paroxysms of coughing and unthriftiness form the principal symptoms of disease.

There are a number of different remedies and methods of applying them for the treatment of lousiness in hogs. If a herd becomes infested with this pest it is difficult to free the hogs from it. The remedy must be applied frequently in order to prevent the lice multiplying in such numbers as to interfere with the health of the hogs. Stock dips or coaltar disinfectants are largely used for destroying lice. They are used in from 1 to 2 per cent water solutions. Spraying, sprinkling and dipping the hogs in a tank are the common methods of applying the remedy. Sometimes the disinfectant is poured into wallow holes and wallowing pools and the lice are destroyed when the hogs wallow or bathe in them. Crude oil is an effective remedy for lousiness. It is best used in a dipping tank. A thin layer of oil is poured on top of the water in the tank and the hogs are driven through it.

Preventive measures are of the greatest importance in the treatment of intestinal and lung para-

sitic diseases. This consists in avoiding conditions favorable to infection in the pastures and pens, and keeping the sleeping quarters, feeding floors and drinking troughs clean. Keeping the pig in a growing, thrifty condition is an effective preventive measure.

A number of different drugs may be given for the purpose of destroying the worms or driving them from the intestine. Turpentine given in a milk emulsion is a common remedy. The dose is one teaspoonful for every 80 or 100 pounds live weight. The treatment should be repeated daily until three doses are given. A very efficient remedy for the removal of intestinal worms is a mixture of santonin and calomel. From 3 to 5 grains of santonin and 5 to 8 grains of calomel should be given for every 100 pounds live weight in pigs and young hogs. Powders of this mixture large enough for 10 or 15 animals should be prepared. The herd is then divided into bunches containing this number. Ground feed is placed in a trough and one of the powders sprinkled over the feed. The hogs are then turned into the pen and allowed to eat it. It is advisable to keep the hogs off feed over night and dose them in the morning.

CLEANLINESS AND THE HOG.

While hogs will eat almost anything they should be denied carrion, putrid offal and all grossly unclean stuff. Avoid highly-seasoned feeds and dosing with tonics. An exclusive diet of anything is unprofitable. The hog is cleaner than is generally

believed, the primitive specimen being as clean in its habits as any other wild or domestic animal. Even today the domestic hog when given a natural environment daily demonstrates the possession of cleanly instincts. Its filthy habits may be attributed to the conditions of existence to which it has been subjected by man. No other farm animal is so useful, measured by the unit of production, as the hog. Cleanliness of feeds for hogs pays. Whatever the nature of the feed, it should be of known cleanliness.

CASTRATION AND SPAYING.

Castration of boars is necessary before they can be profitably developed into pork, and the earlier in the pig's life the operation is performed the better. Boars that have not been castrated until they have been used for some time in breeding will always as a result show certain undesirable masculine traits. Such animals are termed "stags" or "roughs," and they are docked 80 pounds per individual at all markets and range in price about \$2 per cwt. less than smooth, well-finished barrows and sows. The best age at which to castrate is shortly after weaning. While some raisers castrate and wean at the same time, it is best to let a week or so intervene before performing the operation. Castration should take place, however, before the pig has reached over 100 pounds or thereabouts. In timing the operation local conditions should be taken into account. The weather should not be extreme

and the operation should be delayed if the pig is not in good condition. There are cases, however, when pigs are not apparently well but improve rapidly after a little blood-letting incidental to the operation. But unless they are in fairly normal condition, and responding to their feed by an evenly-balanced growth, the shock should not be imposed upon them. In the case of healthy pigs the operation has practically no disturbing effect on the system.

The following method of castration is one that I have practiced for the last sixty years: The requisite instrument is a good castrating knife which should be freshly sharpened for each operation and sterilized by dipping into an antiseptic, or into boiling water, immediately before using. The hogs to be operated on should be secured in small pens away from other hogs, so that they can be caught easily. The catching and holding during the operation should be done by a strong, intelligent man who will not injure the animals in catching them. If he be careless in the matter he may cause lameness or other injury. The pig may be caught either by the ears or by both hind legs, and with a little practice the helper will become expert in doing this and in throwing the pig. The pig should be thrown upon its left side, and the helper should place his left knee upon its neck, hold the right foreleg with his left hand, and the right hind leg with his right hand, and draw the right hind leg forward until the operator has room to work.

The operator then takes hold of the scrotum over

the lower testicle and works it out until the scrotum is fully distended. Then, beginning at a point on the scrotum low enough to insure subsequent drainage of the wound, he makes a firm, quick, upward incision, cutting through the outer and inner skins of the scrotum and exposing the testicle. The pressure of the left hand will force the testicle out and as it emerges it is grasped by the left hand and drawn slowly away from the body. At the same time, with the right hand and using the back of the knife blade, the cord is scraped in the direction of the body and just before reaching the point of emergence from the scrotum it is bruised a trifle. The knife is then turned and the cord cut at a point just beyond the bruised part, so that the bruised part may remain as the end of the cord. The other testicle is removed in the same manner. If the operation is performed in very hot or cold weather an antiseptic treatment should be given after it is over. For this purpose crude carbolic acid, a coal-tar dip, turpentine and pinetar are generally used. Care should be taken not to use them in too strong solutions, however.

In castrating older boars the same method of holding may often be used, but a better way is to secure a ringed rope over the snout and fasten the other end to a post or tree. Then, with one man holding the rope, the operator can work from behind. In the case of older boars the bruising of the cord should be more thorough than in the case of young pigs, and the antiseptic treatment after the

operation should always be applied. In every case it is important that the incision should be made so low that the scrotum will drain perfectly. The operation of castration is much complicated if the boar is ruptured, as that condition makes necessary the removal of the sac which encloses the testicles. Where the rupture is serious a veterinary surgeon should be employed for the operation. Such boars should be kept off feed for 12 hours before the operation. They should be secured as already described except that the hind parts should be elevated. The incision is made in such a manner as to include only the outer skin of the scrotum and large enough to permit of the emergence of the sac containing both testicles. When the sac is well clear of the body an antiseptically-treated string should be tied around the cord behind the sac, and as the sac is worked out the protruding intestine should be worked back into the body of the hog. Then the sac may be cut away, seeing that the string is securely tied around the cord, and the string should be left hanging a few inches on the outside of the wound, thus insuring proper drainage by keeping the wound open until it heals from within. Finally an antiseptic treatment should be given to the cut parts. This method will work in the case of simple ruptures, but in the case of many kinds of rupture different steps will have to be taken.

Spaying was practiced by many hograisers in the past, but under the present methods of caring for swine its use is not generally considered profit-

able. It is a delicate operation, requiring the services of an experienced operator or of a veterinary surgeon, and so its use is not likely to become general. Instead of it, the raiser can arrange the feeding of his sows so that the periods of heat will interfere very little with their growth. It is customary with many raisers to breed their sows at the beginning of the finishing period or about 60 days before marketing.

A Veterinarian's Method.—Dr. A. S. Alexander of the Wisconsin Experiment Station gives the following instruction on castrating: A great many men who castrate pigs find out to their cost that they did not do the work properly, but just where the mistake has occurred they are not sure. The evidence of something wrong is seen in a large, hard swelling of the scrotum. The pig walks stiffly and in some instances loses flesh and appetite. In time flies begin to bother and the tumor becomes a raw, angry, discharging mass, having an offensive odor. This is technically termed a “champignon” or “scirrhous” cord or tumor and the cause is as follows: When the incision was made in the scrotum it was too small and through it the testes merely popped out and were removed. Healing took place quickly and the cords, left too long, were caught and healed between the lips of the wound. A tumor now commenced to grow, and, blood vessels feeding it, increased in size. A fungus spore called “botryomyces” now found this favorable breeding place, took root and commenced to luxuriate, giving rise

to the aggravated condition often seen in the worst type of these tumors, which are not always due to or invaded by the fungus. Such growths are easily prevented, but difficult and dangerous to treat because hogs do not successfully withstand operations causing loss of blood or shock.

Prevention is to be sought in making a wide, free, long incision in the scrotum at time of castration. Simply split right open from one end to the other of the scrotum and right down to the testicles and through their envelopes at one gash. Sever the cords high and when this is done if there is the slightest pocket left in the scrotum split it open to prevent its acting as a receptacle for pus or clotted blood. When this is done the wound will not heal so quickly but it will be impossible for the cord to become attached to the scrotal walls and scirrhus cord will never happen.

On farms where this trouble has been experienced it is further well to put something in the wounds to prevent healing by "first intention" (immediate healing) and for this purpose we would recommend turpentine ointment of a mixture of one drachm each of iodoform and turpentine to an ounce of lard or lanolin. When a case is experienced, despite all precautions, the sooner it is operated on the better, for the longer it is postponed the more danger there will be in operating. The operation consists in turning the pig, washing the tumor and surrounding parts with a 2 per cent solution of creolin or other effective antiseptic, then carefully dissecting the

cord free from its attachments with the scrotal walls and tying the large blood vessels met with. When the cord is cleared apply the emasculator or ecraseur chain and slowly sever the cord, insert some of the iodoform ointment and the operation is complete. Should the animal seem weak give at once a stimulant, such as brandy in ounce-doses once an hour and give a sniff or two of ammonia. Starve the patient for 12 hours before operating and allow a soft mash or slop just after the work is finished. Keep the pig in a clean pen for a few days and see that the bowels are kept open with succulent cooling diet.

So-called "water seed" (a collection of serum in the scrotum after castration) will not occur if these precautions as to cutting and after treatment are followed. Where the pig is ruptured in the scrotum it must be castrated by the covered operation, which consists in splitting open the scrotal wall alone, making a small incision, and taking care not to injure or cut the envelopes of the testicles. This done, press back the bowel, gather the testicle in its envelopes into the hand and put on wooden clamps, which may be allowed to slough off. Some remove the testicles and sew up the incision in the envelopes and then in the scrotal skin, but this is a poor plan, and a little experience will enable any intelligent man successfully to operate in the other way.

DRENCHING HOGS.

Drenching is an easy matter if properly carried out. While there are several methods, the follow-

ing is the easiest: To drench mature hogs, a rope with a ring in the end is secured around the hog's upper jaw, and the other end is hitched to a post at such a height as to elevate the hog's head. A 1½" or 2" round stick, 2' or 3' long, is held cross-wise in its mouth between the grinder teeth. Drenching can then be given in perfect safety with a long-necked bottle. The dose should have been measured into the bottle beforehand, and care should be taken not to strangle the hog, either by giving the liquid too fast or by giving it while the victim is struggling or squealing. If the hog refuses to swallow, the throat should be gently kneaded. In drenching pigs, they should be held up by the front legs in a sitting position between the holder's knees, with their backs to him, while another man operates the drenching bottle, keeping their mouths open with a stick meanwhile.

VERMIN AND PESTS.

Rats, mice, pigeons and crows are among the pests of which the hograiser must beware. Rats and mice nest among the hogs' bedding, eat there, and contaminate their sties and feed. Rats are especially dangerous because they are afflicted with trichina. Hogs should be guarded against eating either rats or mice. Corn that has been visited by either should only be used for hogs after it has been soaked in a light lye water or given some other sterilizing treatment. Crows and pigeons feeding in hogyards often carry disease germs from one to

another, especially hog cholera. Dogs, ducks, geese and other wandering animals and birds should be discouraged for the same reason, and last, but not least, the common house fly or "typhoid fly," is a very prolific spreader of disease.

SORE TAILS OF PIGS.

A few days after a litter is farrowed inflammation usually occurs at the roots of the pigs' tails, due to scours, bad bedding and lack of sunshine. The circulation being weak in this appendage, relief cannot be secured by internal doctoring, so nature removes the diseased part by checking and cracking the skin around the tail base, and if local treatment is not given in time the circulation of blood will cease past the affected point, and in a few days the tail will slough off from the living or stub part. As a preventive, avoid scours, keep the bedding sanitary and at the first sign of trouble apply pure sewing machine oil or mentholatum several times daily. Peroxide of hydrogen or boric acid will cleanse the sores. Pigs are rarely troubled with sore tails after two weeks old.

BLACK TEETH.

Pigs at birth have little tushes or teeth that stick straight out at the fore part of both the upper and lower jaws, two on each side, generally of a yellow or brown color. The youngster often uses these teeth in contending with other members of the litter for the possession of a teat. Since the teeth are very sharp, fighting causes sores to develop on their jaws, lips, noses, and occasionally on their

tongues. Filth that collects in their quarters infects the wounds and sores develop. Pigs in their fighting also cut the sow's teats, causing inflammation and soreness which cause her to injure the pigs. Soon after pigs are farrowed examine them for vicious teeth, and if they promise to be any great source of danger remove them with a small pair of pliers. Antiseptic and healing lotions should be applied to noses and udders.

REMEDIES AND CONDIMENTAL FEEDS.

Condimental feeds are often sold under a guarantee to give greatly increased gains, to aid in maintaining perfect health, tone up the entire system and in some cases to prevent or cure nearly every known hog disease. Analyses of these feeds do not bear out the claims of manufacturers. The basal ingredients generally are of cheap materials and the majority of them are made up of charcoal, salt, epsom salts, sulphur, glauber salts, limes, sodas, gentian, fenugreek, with an over abundance of inert matter, such as mill sweepings, corncobmeal and low quality feeding stuffs. The analysis of stock powders oftentimes show the presence of many high value ingredients, but the contained quantities are usually so small that the claim is misleading and erroneous. Wood ashes, charred corncobs, charcoal, sulphur and salt will excel any stock food from both economical and result standpoint. Most feeders can prepare feed or tonic mixtures on their own premises at a much lower cost. While proprie-

tary feeds may improve the health and condition of animals that are in a run-down state, hogs in form generally will not give profitable returns for the use of condimental feeds bought at the average price. My judgment is that few remedies can be relied on to cure or to prevent any disease, none except serum for hog cholera.

SUNLIGHT AND VENTILATION.

The value of sunlight and ventilation in hog-houses is not fully appreciated by most hogmen. That both are as essential as feed may seem incredible, but this is true. A few hours of sunshine will tone up a young litter wonderfully. Sunlight also destroys disease germs. Arrange all houses and yards so that a few hours of sunshine may be enjoyed daily by the pigs and their mothers. Next in value to the sunlight in hoghouses is ventilation. The benefits derived by hogs from oxygen-charged, sun-kissed air is incalculable. We cannot expect hogs to thrive in dark, foul, ill-kept, unventilated places, in which disease is propagated. Clean, sunlit, well-ventilated houses should be provided.

DIPS AND DISINFECTANTS.

On account of contagious diseases, lice and parasites, it is necessary to adopt preventive and remedial measures. Although it is not practicable to absolutely protect against disease, it is a breeder's business to control conditions so that dangers will be reduced to the minimum. A corrosive sublimate solution sprayed or sprinkled over the infected

premises or crude carbolic acid, a .2 to 5 per cent solution, in water sprayed or sprinkled over the premises, are best germ destroying agencies. Lime, either slacked or unslacked, scattered over the yards, in houses, runways, collections of offal and water holes, also crude oil and kerosene, give economical and satisfactory results. Coaltar preparations are also effective.

Lice.—The hog louse would seem to be a creation of domestication, as the primitive wild hog was not afflicted by it. It feeds on the skin, and unchecked is a serious drain upon the hog, especially suckling or young pigs. Hog lice multiply rapidly. To kill them use crude petroleum or medicated oil. In my experience there is no dip or preparation so effective and economical as crude oil or petroleum. It can be used in mudholes, water-holes and on rubbing posts. Dipping is too expensive for the generality of farmers to practice. In using crude oil in a dipping vat, it is only necessary to keep the surface of the water well covered with the oil to give satisfactory results. My method of applying crude oil is to confine the hogs in close quarters and sprinkle them over the backs and heads with about one gallon of crude oil to 40 head, using an old sprinkling pot or broom. The oil will soon spread over nearly the entire body. Houses and bedding should be frequently disinfected. Small spray pumps will successfully apply dip crude oil and medicated dip oil solutions. Practical experience with a cheap tin spray pump demonstrates that for small hograisers

they are practical for nearly all uses of disinfecting hogs and premises. A popular mixture for use by a spray pump is as follows: $\frac{1}{4}$ crude oil, $\frac{1}{4}$ extra paraffine oil, $\frac{1}{4}$ gasoline, $\frac{1}{4}$ kerosene. Mix well and see that the oils are cut before placing in the spray pump.

DISPOSAL OF DEAD HOGS.

The government and all states should pass laws regulating the disposition of dead carcasses. Definite, prompt action often checks the spread of disease. Carcasses of diseased hogs should be burned. Dig a trench 14 to 18" wide, 12 to 18" deep and 6 or 8' long, in some slope or side hill, so one end is open to give a good draft. Place iron bars across the top every 6 or 8" and lay a few kindling boards or dry wood on the bars and place the hog on lengthwise of the hole. Have some cobs and wood in the trench upon some rocks or a slight elevation of dirt. Start a fire, using a little kerosene if necessary, and with an axe or knife make long slits in the sides of the hog so the fire can get at the fats. Replenish the fire from time to time and the hog will cremate thoroughly. Hogs may eat the charred and burned ashes, but no hog should eat any part of an unburnt carcass. In burying hogs put the carcasses at least 4' under the surface and throw in quite a quantity of lime. Never throw carcasses in streams or bodies of water and do not leave them where any animal or scavenger can get at them. Any man who does otherwise is an enemy to society and should be prosecuted.

PORK PRODUCTS.

In chemical composition hogs vary according to size, age, breed and how they have been fed. Analyses of hogs in thrifty growing condition show about 50 per cent of the weight of the carcass is water, varying with the age and condition of the hog. In protein the percentage is given as from 11 to 15. Protein is found throughout the body, its preponderance being in the muscles or lean meat. The amount of fat in a hog's body varies more than any other constituent. Extremely fat hogs sometimes show almost one-half their weight in fat, which is entirely too much; while hogs that are in extremely poor condition will not test out more than 20 per cent. Good thrifty hogs should show about 30 per cent, with market individuals around 40 per cent. Ash is found mostly in the bones, although like protein it is contained in other parts, constituting in all about 3 per cent of the total weight of the hog.

From an official in one of the large packing houses I have the following notes:

“Opinions vary greatly as to the best breed of hog from the packers' standpoint. The writer is inclined to favor Berkshires, as, when marketed at proper ages and weights, they make fancy light lean cuts, when these cuts are in demand; and again,

when heavy fat cuts and lard command a premium, this breed can be fattened and put on the market as heavy fat hogs, making the cuts and lard desired. The type looked for by all packers should show good dressed yield on the hooks and the minimum of waste in dressing, having small compact internal organs and a minimum of waste matter, small feet, head and shoulders, the weight running to sides, and hams wide, firm, lean and fat, with smooth thin skin. The objectionable types from the packers' standpoint are those where the weight runs to head, feet and shoulders, with heavy weight in the internal organs, affecting the dressed yield; or the type fed so as to produce soft or oily meats, for which there is always difficulty in finding a market."

I am indebted to Prof. Louis D. Hall of the Illinois Experiment Station for the following admirable illustrated treatise on the market classes and grades of pork. The matter and pictures prepared by Prof. Hall are from Bulletin No. 147 of that institution:

Hog products may be described under three heads: (1) *Dressed Hogs*, (2) *Pork Cuts* and (3) *Lard*. As a rule, not more than one or two per cent of the number of hogs slaughtered in large packing houses are sold as whole carcasses. Approximately three-fourths of the trade in hog products consists of various cured meats and fresh cuts, the remainder consisting principally of lard and a small percentage of sausage and canned meats. Further, fresh pork is of much less importance, relatively, than fresh beef or mutton, only about one-fifth of the domestic

trade and 5 per cent of the export trade in pork products (other than lard) consisting of fresh meat. Thus the classification of pork consists largely of cured and manufactured products, the number and variety of which render the outline of this subject quite complex.

DRESSED HOGS.

The classification of hog carcasses is based on the uses to which they are adapted, or the products into which they can be converted. The classes generally recognized and average weights included in each are as follows:

	Carcass weights
Smooth heavy or heavy loin hogs.....	240 to 400 lb.
Butcher or light loin hogs.....	160 to 240 lb.
Packing hogs	100 to 400 lb.
Bacon or marked hogs.....	90 to 170 lb.
Shippers	100 to 200 lb.
Pigs	20 to 100 lb.

Different styles of dressing are characteristic of the different classes of carcasses except heavy and light loin hogs, and shippers and pigs. Dressed hogs of all classes are cut open along the underline and through the aitch-bone and brisket, but the method of splitting and trimming varies with the class, as follows: Loin hogs are split down through the center of the back-bone (loin-split or centre-split) in order that pork loins may be cut from the sides. They are dressed packer style, that is, head off, leaf out and hams faced. The jowls or checks are left as part of the carcass. Facing consists in trimming a strip of fat from around the face of the ham, so as to expose a larger lean surface. Packing hogs

are usually split like loin hogs, but are sometimes split on one side of the back-bone, making a hard and soft side. In either case they are dressed with head off, leaf out and hams faced. Bacon hogs are usually cut (marked) with a knife on each side of the back-bone, then split on one side and the back-bone taken out, making sides suitable for English bacon cuts. The head is taken off and leaf out, and the hams are either faced or not, according as they are intended for short-cut or long-cut hams. Shippers and pigs are dressed shipper style, that is, with head on, leaf in, back-bone not split and hams not faced. Only shippers and pigs are extensively sold as dressed hogs. The other classes are cut up directly after being chilled, except relatively small numbers of butcher and packing hogs that are handled by jobbers or sold to retail dealers for fresh use.

Grading Dressed Hogs.—The grades of hog carcasses are much less numerous and complex than those of carcasses of beef or mutton, owing to the greater variation in the latter with respect to age and general development. Standard grades are recognized only in the bacon and packing hog classes. In a broad sense, however, the six general classes may be regarded also as grades, since they are differentiated largely by shape, finish, quality and weight as well as by styles of dressing. The shape desired in loin and packing hogs is great width of side and back in proportion to length of body, straight, even lines and well-filled hams and shoul-

ders. In bacon hogs length of side is more important, with less width and thickness of back in proportion to that of the side than in the grades of fat hogs. Finish is indicated by the depth and evenness of fat covering the carcass, especially along the back and over the sides; also by the amount and quality of leaf fat. The leaf is the internal fat of the carcass. It includes the kidney fat and extends down to the flanks and skirt (diaphragm). It is essential that the fat be white and firm. Quality implies firm, bright, smooth-grained flesh and solid, white fat evenly distributed over the carcass; smooth, thin, mellow skin free from wrinkles, blotches or bruises; moderately small, fine shanks and head; soft, red chine-bones, back-bone and brisket; and an absence of coarseness in general. Points of special importance in selecting dressed hogs are the development and quality of loins and sides, and the size, shape, firmness and covering of the hams. Coarse or extremely large shoulders, neck and jowls, are indications of stagginess, and "seedy" sows are classified as packing hogs because of their coarse quality. The term "seedy" refers to the nipples or teats of sows that have borne pigs or reached an advanced stage of pregnancy. In general, weight is an important factor, and in the case of loin hogs it determines not only the grade but also the class to which a carcass belongs.

Smooth Heavy or Heavy Loin Hogs.—These are prime smooth hogs, either barrows or good, clear

(not seedy) sows, weighing 240 to 400 pounds, with from four to six inches of fat on the back; thick, wide, level sides without depressions in the back; heavy hams, filled out even with sides, full at the rump and well rounded down toward hocks, without wrinkles or flabbiness; smooth shoulders; short, full neck; and full but not coarse jowls. The skin must not be thick, hard, nor wrinkled. The flesh and fat must be deep, firm and even, the flesh bright-colored, the fat white and bones not coarse. As their name indicates, such hogs are especially suitable for making heavy loins, the remainder of the side being made into a heavy fat-back and dry-salt belly. However, under certain market conditions they are cut into the same products as heavy packing hogs. The hams are usually skinned and the shoulders cut into picnics, butts and plates. Hogs of this class are a very small per cent of the supply.

Butcher or Light Loin Hogs.—The term butcher refers to butcher shop or retail family trade. A large proportion of the fresh pork sold in retail markets is pork loins, which are cut into chops and roasts; hence light loin or pork loin hogs are those from which these cuts can be obtained to best advantage. To yield loins of the proper size and quality, a hog carcass should weigh about 160 to 240 pounds and have the same shape, smoothness and general quality already described with reference to heavy loin hogs. Thick, firm flesh, smooth, soft skin and solid, white fat are especially important. The covering of fat should be two to four inches thick

on the back. This class is composed of barrows and smooth, clear sows. The weights most preferred for butcher hogs are 200 to 220 pounds. They are principally cut up by packers, the loins being sold to retail dealers or jobbers. Besides loins, fat-backs, clear bellies, extra ribs and extra short clears are commonly made from sides of butcher hogs. The hams are cut short and the shoulders principally made into picnics, New York-cut shoulders and Boston butts. In some instances, carcasses of this class are sold to retail markets for fresh trade, in which case they are dressed either head on or head off, as ordered.

Packing Hogs.—This class includes mixed hogs of all weights which are too coarse in quality, rough in shape or soft and uneven in finish to be suitable primarily for fresh pork products or smoked meats and are therefore principally packed in such forms as barreled pork and dry-salt meats. About one-half the hogs handled in Chicago packinghouses belong to this class.

Heavy packing hogs, also known as rough heavy or mess pork hogs, consist of rough and seedy sows, coarse barrows, boars and stags averaging 240 to 400 pounds. All heavy hogs that are too rough to be classed as loin hogs are included in this grade. Defects common to these carcasses are thick, rough and wrinkled skin, dark-colored and coarse-grained flesh, soft, oily fat, large bones and carcass bruises. They are more largely cut into short ribs and mess pork, and less into loins, fat-backs and bellies than

heavy loin hogs, and consequently are more frequently "marked" and side-split, although at times a large proportion of them are loin-split and pork loins taken out. The hams are sweet pickled and shoulders made into picnics and Boston butts.

Medium packing hogs are sows and barrows averaging 200 to 240 pounds that are inferior to butcher hogs in quality; they also include a small proportion of stags and boars. The cuts made from this grade are dry-salt sides, mess pork, clear backs, dry-salt and English bellies, pork loins, short-cut hams, and New York-cut and picnic shoulders.

Light packing hogs are mixed hogs of 100 to 200 pounds' weight that are too deficient in shape, quality and finish to be classified as either bacon, butcher or shipper hogs. This grade consists largely of light sows. They are cut into prime mess pork, short clear backs, clear bellies, short-cut hams, and picnics, New York and skinned shoulders.

. *Bacon or Marked Hogs.*—Bacon hogs are those that are suitable primarily for sugar-cured breakfast bacon bellies and English meats. Since such meats must be comparatively lean, firm and of good quality, the leading features of bacon hogs are long, deep, smooth sides with a light, even covering of fat over the entire carcass and especially uniform on the back and sides. The hams should be full but lean and the shoulders light and smooth. The flesh must be firm and not watery, the fat solid and the carcass sufficiently mature to insure proper curing. Hogs which fulfill these conditions weigh 90 to 170

pounds dressed. Low grades of bacon are made from pigs as light as 60 to 70 pounds, but the most desirable weights are 120 to 150 pounds. They consist principally of barrows, but for most grades of bacon smooth, clear sows that resemble barrows in general quality and finish are used to some extent. Only a small percentage of the dressed hogs handled at Chicago are of this class. The products principally made from them are "English" middles, backs and bellies, domestic breakfast bacon bellies, long-cut and short-cut hams. Bacon hogs vary from choice to common in quality, finish and shape, and although no fixed grades are universally recognized among packers, they are usually designated as choice, good and common, respectively. Choice bacon hogs must be evenly fleshed and covered with a smooth layer of fat over the loin, shoulders and sides. Firm flesh, solid, white fat, and a white, smooth skin are especially important in this grade. The depth of back-fat is from one and one-fourth to two inches. It must be evenly distributed, however, not varying more than one-fourth or three-eighths of an inch at different points on the back and shoulders. Large sides of even width are also essential. This grade is used for the manufacture of Wiltshire and Staffordshire sides, English backs and bellies, and fancy breakfast-bacon bellies, also Cumberland sides to some extent. They weigh about 120 to 160 pounds, and only barrows are generally used. Good bacon hogs include those that either lack the prime finish required of the highest grade or are too thick-

ly or unevenly covered with fat; also those that are slightly deficient in length and depth of sides, or firmness and quality of flesh and fat. This grade therefore contains a much larger variety of carcasses than the choice grade, but they must nevertheless be reasonably well suited to the manufacture of smoked bacon and English meats. The thickness of back-fat must not be less than one nor more than two and one-half inches. Average weights vary from about 110 to 170 pounds. Cumberland, Wiltshire and long clear sides, English bellies and domestic breakfast-bacon bellies are made from this grade. Common bacon hogs are below the average in finish, quality and weight. Though a hog may have the proper amount of fat, if it is unevenly distributed over the back and belly and not well mixed with the lean, the sides are not adapted to making good bacon. Carcasses that are too fat to grade as good bacon hogs are classified as packers rather than common bacons. The latter are principally light unfinished carcasses, the poorest of which are so thin as to be known as skippy or skinny hogs. The grade also includes some that have sufficient fat and weight but are soft and dark-colored in their flesh and fat and coarse in general appearance. Average weights of this grade are 90 to 110 pounds but a few range from 60 to 130 pounds. Common to medium bacon hogs weighing 90 to 130 pounds are used for long rib sides, and 60 to 110-pound averages are made into Dublin middles. The latter, though of the same weights as heavy pigs, are gen-

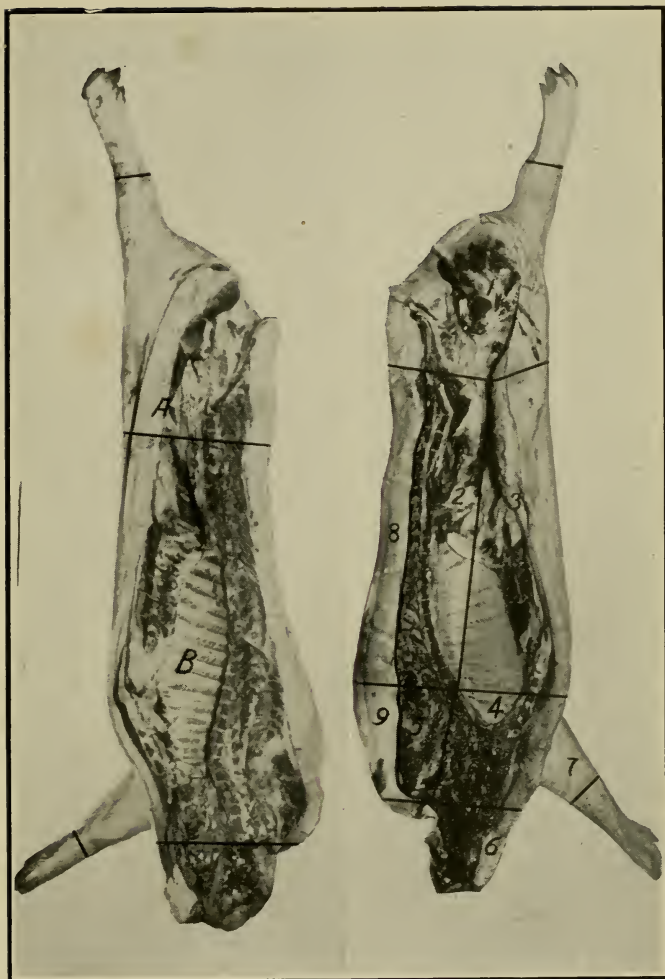
erally distinguished from them by darker-colored flesh and harder, whiter bones.

Shippers.—Shippers are similar to Butcher Hogs in shape and quality but are lighter in weight and generally not so highly finished, having only a moderate covering of fat and a comparatively small amount of leaf fat. As compared with Bacon Hogs they are shorter and thicker-bodied, have a deeper and less even covering of fat, heavier jowls and show less age in proportion to their weight and general development. They average 100 to 160 pounds and are dressed head-on. Since their chief use is for fresh retail trade they must be carefully selected, and carcasses of this weight that show a marked lack of quality such as thick, rough skin, coarse bones, dark color or very uneven covering are classified as light packing hogs. This is the only class of hogs that is extensively sold in the whole carcass. They are shipped in carlots to eastern points, especially New York City, Boston, Buffaló and various New England cities, where they are used both for fresh retail trade and for the manufacture of home-packed meats. The term shipper is also applied by some packers to all other carcasses that are dressed shipper style, and they are quoted in weights from 40 to 280 pounds. In this case, carcasses heavier than 160 pounds are selected from Loin Hogs, and those lighter than 100 pounds are the class described as Pigs. Heavy hogs quoted in this way are bought principally by retailers in small cities and towns, but the trade is very limited and has

been largely replaced by pork loins. Shippers of all grades are sold most extensively during the winter months, when demand for fresh pork is greatest.

Pigs.—Pigs are carcasses of light young swine that are comparatively lean and light-colored in flesh, with thin, soft skins, soft red bones, and weighing from 20 to 100 pounds. They are dressed shipper style and are often quoted together with Shipper Hogs. Thin and coarse or staggy pigs are frequently termed "throw-outs." Pigs are chiefly used for fresh trade in small retail markets, where the heavier grades are cut into chops, pork steaks, hams and other fresh cuts, and the smaller carcasses are retailed to certain laboring classes by whom they are used for boiling purposes. New York is the leading shipping point for 80 to 100-pound pigs. The mining districts of Pennsylvania take many of the lighter averages, 60 pounds and under. Export pigs are selected carcasses of choice quality averaging 80 to 100 pounds, dressed "head off" and wrapped in muslin. Roasting Pigs are dressed sucking pigs which are fat and smooth, with white skins and flesh, indicating a well-nourished condition. They are country-dressed, as a rule, with head on and the carcass opened only from the crotch to the brisket. Roasters are principally shipped like winter lambs direct to the hotels and restaurants that use them. The most desirable size is 15 to 20 pounds, but pigs weighing 10 to 30 pounds are used.

Pork Cuts.—The various cuts made from dressed hogs may be divided into the following general



PORK CUTS.

English Cuts—A, Long-cut ham. B, Long side or middle.
 Domestic Cuts—1, Short cut ham. 2, Loin. 3, Belly. 4, Picnic butt. 5, Boston butt. 6, Jowl. 7, Hock. 8, Fat back. 9, Clear plate. 2, 8, Back. 2, 3, 8, Side. 4, 7, Picnic shoulder. 5, 9, Shoulder butt. 8, 9, Long fat back. 4, 5, 7, 9, Rough shoulder.

classes: Hams, Sides, Bellies, Backs, Loins, Shoulders, Butts and Plates, and Miscellaneous. See the preceding page.

These products are quoted and handled according to the manner in which they are prepared or packed, viz., Fresh Pork Cuts, Dry-Salt and Bacon Meats, Barreled or Plain-Pickled Pork, Sweet-Pickled Meats, Smoked Meats, "English" Meats and Boiled Meats. It will be necessary to define these terms before attempting to describe the grades and uses of the different classes of cuts.

Fresh Pork Cuts are sold either chilled or frozen. The bulk of the uncured product is disposed of within a few days after slaughter, during which time it is chilled at temperatures slightly above the freezing point. Freezing is employed for the storage of pork loins and other fresh cuts and edible offal when supply exceeds demand, and in some cases for keeping bellies, hams, shoulders and other cuts intended for future curing. Frozen pork, however, is not quoted nor handled to the same relative extent as frozen beef and mutton. Cut meats may also be kept without curing by packing in brine and storing at about 15° F., until it is desired to cure them in the regular manner. Cuts packed in a light brine and kept slightly above the freezing point for a short time are sometimes sold as "partly cured" meats.

Fresh pork cuts are taken more or less from all classes of hogs. Since the pork is by far the leading fresh cut, light loin hogs are more extensively used for fresh pork than any other class. The varying

demand for loins determines to a considerable extent the method of cutting other classes of hogs from time to time. Tenderloins and spareribs are also primarily fresh cuts. Skinned shoulders, shoulder butts, hams, bellies, fat-backs, and raw leaf fat are sold fresh to a small extent. Some packers purchase their raw material in the form of fresh cuts, such as bellies, hams, picnics, leaf and back fat, and convert them into smoked meats, lard and other products bearing the trademark of the packer.

Dry-Salt Meats are domestic cuts made from heavy fat packing and loin hogs, cured and shipped in coarse salt, and with a few exceptions pumped before salting. Brine is injected into the meat by means of a perforated hollow needle attached to a force-pump. These are distinct from English meats both as to selection and packing. The cuts that are sold in this form are heavy sides, bellies, shoulders, fat-backs, plates and jowls. The same cuts, and particularly bellies and short clear sides, are also quoted as bacon meats, which, after being cured in dry salt, are smoked before shipping. The term Bacon, when used as a prefix, refers to dry-salt meats, while Smoked Meats, as described below, are cured in sweet pickle. Dry-Salt and Bacon Meats are generally shipped loose, but are sometimes put up in boxes containing 25 to 500 pounds.

Barreled or Plain-Pickled Pork is packed in plain salt brine in tight barrels (18" x 29") at 200 pounds net weight of cured pork per barrel (355 pounds gross). The strength of brine is varied somewhat

according to the cuts of pork and their destination. The regulation of the Chicago Board of Trade governing standard barreled pork (except prime mess) is as follows: "Between Oct. 1 and the last day of February, inclusive, 190 pounds, and between March 1 and Sept. 30, inclusive, 193 pounds of green meat * * * shall be packed in each barrel, with not less than 40 pounds of coarse salt and barrel filled with brine of full strength; or 40 pounds of coarse salt and in addition thereto 15 pounds of salt and barrel filled with cold water." This period of five months is known in the pork trade as the "winter packing season," and the rest of the year as the summer season. Formerly, wholesale pork-packing was limited almost entirely to the winter season, but with improved facilities packers now handle about three-fifths of the annual supply during the summer season. Standard prime mess pork is packed 20 pounds salt and 12 ounces of saltpetre per barrel, otherwise as above. Barreled pork is made largely from sides of Packing and Heavy Loin Hogs, and consists principally of mess, fat-backs and belly pork of various grades. A much smaller proportion of the pork supply is barreled than formerly.

Sweet-Pickled (S. P.) Meats are cured in sweet brine. Standard cuts of this class are packed as follows for delivery on the Chicago Board of Trade: "300 pounds block weight shall be packed in each tierce with either 22 pounds of salt, 3 quarts of good syrup, 12 ounces of saltpetre and tierce filled with water, or tierce filled with sweet pickle accord-

ing to above standard." Various modifications of this formula are used for meats not intended for regular delivery. After curing, sweet-pickled meats are commonly packed in slack barrels or boxes, or sold loose, but are also sold in tierces (21" x 32"), either "pickle on" or "drained." The bulk of sweet-pickled and other sugar-cured meats are smoked before they reach the consumer. A percentage of heavy sweet-pickled hams, picnics and loins are also boned out and sold as boiled meats. The cuts that are quoted as sweet-pickled meats are hams, picnics, New York-cut and skinned shoulders, boneless butts, light bellies, and spareribs. This class of meats is cut principally from Butcher Hogs and from medium and light Packing Hogs; hams and picnics from all classes of hogs are generally sweet-pickled.

Smoked Meats are sweet-pickled and smoked after curing. They also include light breakfast bacon bellies that have been dry-cured in salt and sugar. In packing smoked meats, fancy hams and breakfast bacon bellies are wrapped in parchment paper or canvas and packed in 50 and 100-pound boxes and crates. Other grades are sold either unwrapped, canvased, or wrapped in burlap, and either loose, boxed or crated (100 to 500-pound packages) or packed in slack barrels or burlap sacks.

English Meats is a term applied to certain cuts that are dry-cured in English salt and saltpetre, and primarily adapted to English trade, being given a milder cure than domestic meats. They are made

principally from Bacon Hogs. The leading cuts of this class are English bacon sides, long-cut hams, clear backs and bellies, and square shoulders. After curing, these cuts are packed in borax or salt in 500 to 550-pound boxes for export. Borax is principally used, but a small proportion of English cuts such as long clears are shipped in salt, which continues the curing process during shipment. English meats are generally dried or smoked lightly after their arrival at British ports before being sold. Meats cured by this process are used to some extent in this country, being quoted as English-cured. Sweet-pickled meats are also shipped in borax to England in considerable quantities at times, particularly short-cut hams and picnic shoulders; but cuts packed thus are termed Sweet-Pickled rather than "English" meats. The formerly extensive export of "English" meats from this country has undergone a marked decline during recent years, owing to increase in domestic demand.

Boiled Meats consist of hams, picnic shoulders and loins cured in sweet pickle, cooked in water and lightly smoked. The cuts are usually boned and the fat trimmed off within one-half to one inch of the lean before cooking. Boiled hams and shoulders are generally quoted as "rolled boneless" cuts, which are pressed in a cylindrical form, or rolled and tied with cord. Three loins are tied together for boiling, making a loin roll. Boiled meats are made principally from the heavier cuts, but various averages are used, including 12 to 30-pound hams, 10 to 14-

pound picnics and 14 to 24-pound loins. The boning and fattening reduce the weight of hams about 25 per cent and of loins about 60 per cent.

GRADING PORK CUTS.

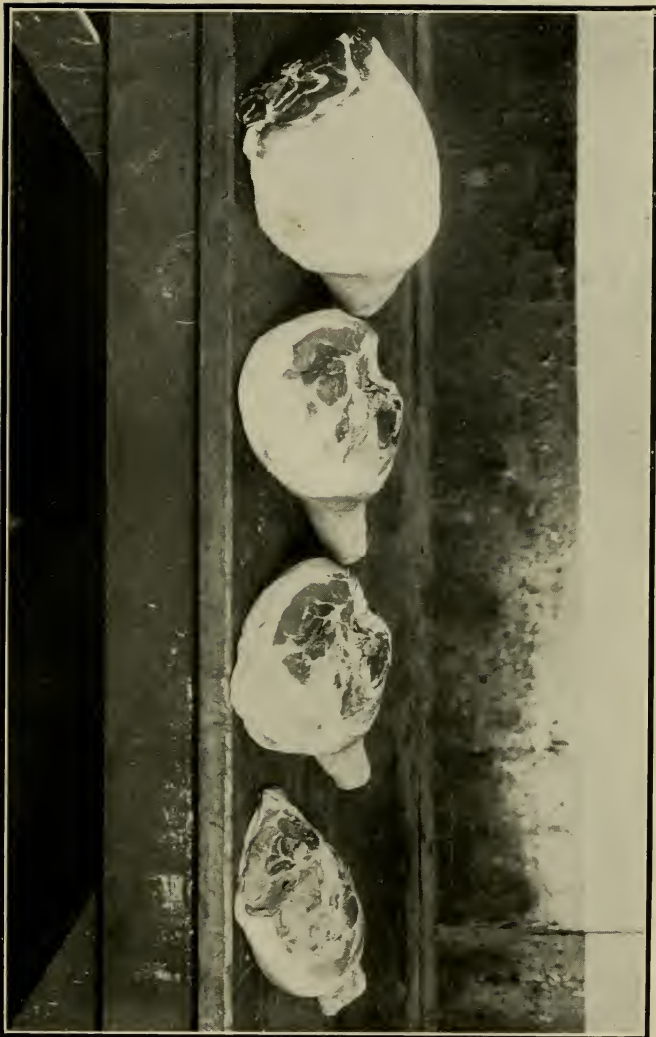
The grading of pork cuts is more complex than that of other meats since it involves not only their quality, shape, proportions of fat and lean, and weight, but also the styles of cutting and methods of packing by which they are prepared for different classes of trade. Many of the grade names refer merely to different methods of cutting and curing; but since they are applied only to cuts of specified quality, thickness or weight, the grades are in reality based on the latter factors to a large extent. The various cuts differ considerably as to methods of grading; consequently an adequate explanation of the factors involved and their relative importance can be presented only by describing the grades of each class.

Hams.—Hams are of two general kinds, short-cut and long-cut. The former are made from comparatively fat, plump hams, trimmed short and round at the butt, and the shank cut off at the hock joint. They are sold either as Regular Short-Cut, Skinned, or Boneless Rolled Hams. Long-cut hams are lean, long hams, with the butt left full and the foot taken off at the first joint below the hock. The principal grades are Regular Long-Cut, Stafford Cut, Manchester Cut and Italian Cut Hams.

Short-Cut or American Cut Hams are cut from

the side midway between the hench-bone and slip-bone, trimmed round at the butt, cushion-faced full, not undercut on the skin side, and shank cut off in or above the hock joint. The hench-bone is the flat portion of the hip-bone that remains attached to the socket joint of the ham when the hog is split. The slip-bone is the portion of the hip-bone that lies in contact with the back-bone near the end of the loin. The cushion is the fat butt of the ham where the tail piece is cut off. Until 1909 the Board of Trade required that the shank be cut above the hock so as to expose the marrow. Practically all hams are sold as sweet-pickled or smoked meats. For regular delivery on the Chicago Board of Trade as sweet-pickled hams they must average, in lots, not to exceed 16 pounds, with no ham to weigh less than 12 pounds and none to weigh over 20 pounds. The short-cut ham is the leading ham cut and has to a large extent taken the place of the long-cut ham in export trade.

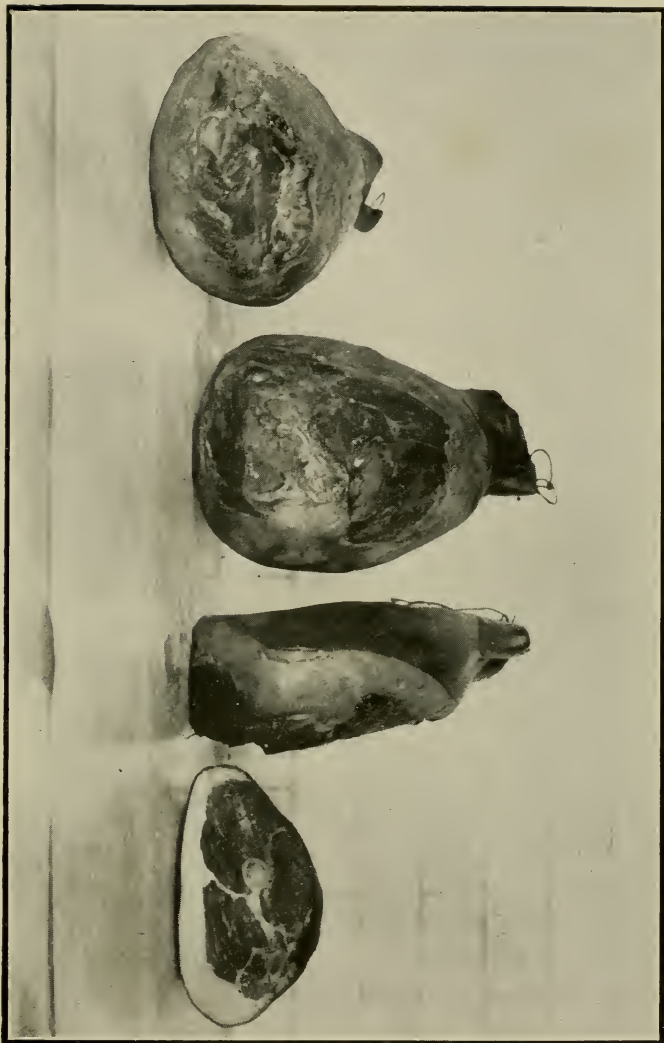
Short-Cut Hams are graded by packers according to the brand of smoked hams for which they are suitable. For the first brand (known as extra selected or fancy sugar-cured hams), they are selected for thickness and firmness of lean meat, plump, well-rounded shape, solid, white fat of medium thickness ($1\frac{3}{4}$ to 2 inches on a medium-weight ham), smooth, soft skin, bright color, small shank and absence of bruises. The bulk of this grade weigh 10 to 16 pounds, 10 to 12 pounds being most desirable for family trade, and 14 to 16 pounds for hotels and



SHORT-CUT HAMS.

restaurants. They are cut mainly from Butcher Hogs. Especial care is taken in curing and smoking to secure the proper flavor and color. Second-brand or second-grade hams (frequently termed No. 1's) are deficient in one or more of the points just mentioned, but must be reasonably good in general quality and not exceedingly deficient in any particular. Many of them are too fat for the first brand. They may be cut from any class of hogs, but the majority are made from Packing hogs. The third brand (also known as seconds) includes those from which a skin-bruise has been removed, also thin, light hams and any others which lack the shape and quality required for regular meat market trade. They are cut from Packing and Common Bacon Hogs. Easter Hams are light, lean hams (6 to 10 pounds) of good shape and quality but cut from smooth young pigs. They are sugar-cured and smoked and are in season during the spring and early summer.

Skinned Hams are cut short, as already explained, the skin is removed down to the shank and the fat trimmed off within one inch of the lean. Until 1909 the Board of Trade regulations required the fat to be trimmed off within one-half inch of the lean. They are made from fat hams of first and second-grades, weighing from 12 to 30 pounds, but the bulk weigh 16 to 22 pounds. Many skin-bruised hams are also skinned in order to remove bruises. This style is especially adapted to making boiled hams, which are in favor with restaurant trade for slicing. From one-tenth to one-fourth of the wholesale supply of



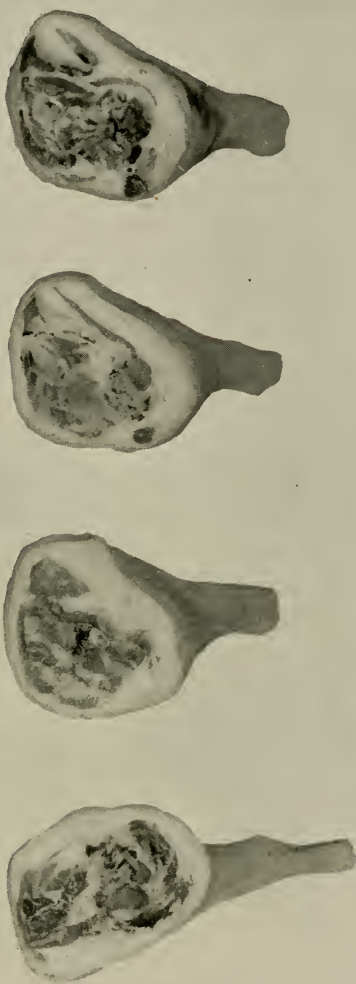
HOME-CURED HAMMS OF HIGH QUALITY.

hams are skinned under usual market conditions. They are quoted both as smoked, sweet-pickled and boiled meats.

Boneless Rolled Hams are made from sweet-pickled short-cut hams by lifting the skin, removing the surplus fat and the bone, and pressing or tying in the form of a roll with skin on. They are also made from skinned hams; 15 to 26-pound hams of first and second-brands are used, and they are sold as boiled meats.

Regular Long-Cut Hams are lean, long hams with only one-half to one and one-half inches of outside fat, and are "cut from the side by separating with a knife the hip-bone from the rump, properly rounded, foot unjointed at first joint below the hock." They are not faced; and the butt end is left full, which gives it a flat, lean appearance. Average weights are 10 to 20 pounds but usually above 14 pounds. This cut is made from good and choice bacon hogs. It is no longer extensively used but was formerly the leading export ham. Yorkshire or York Hams are cut slightly longer at the butt than regular, but are otherwise as described. Both are packed as explained under English Meats. Smithfield or Virginia Style Hams are long-cut and very lean, cured hard, spiced, and aged for several months before using. They weigh 9 to 18 pounds.

Stafford Hams are cut about two inches shorter at the butt end than regular long-cut hams, hench-bone taken out exposing the socket joint, and foot cut off at the first joint below the hock. They are



LONG-CUT HAM.

cut from good and choice bacon hogs and cured for English trade. This grade is made principally from 14 to 18-pound hams.

Manchester Hams are a very lean grade of long-cut hams, comparatively flat in shape, butted like Staffords, and averaging 14 to 18 pounds.

Italian Hams are very thin, long hams, of 9 to 18 pounds average, and of common to good quality. The hench-bone is removed as from Staffords, the leg left extra long, the butt trimmed like American or short-cut hams, the ham pressed flat, dry-salt cured, smoked dark and seasoned with pepper.

Numerous other styles or grades of hams which were formerly packed in large quantities, especially for export trade, are no longer made or used sufficiently to be regarded as standard products.

Sides.—This class includes various grades and cuts of Short Ribs, Short Clears and English Bacon Sides.

Short Rib Sides are middles of hogs from which short-cut hams and regular or New York shoulders have been taken off, with back-bone and tenderloin removed, hench-bone and breast-bone sawed or cut down smooth and even with face of side, feather of blade not removed and no incision made in the side. This is a regular Board of Trade cut and is quoted in provision reports simply as Ribs. It is made from medium to heavy packing hogs, in averages from 25 to 80 pounds but principally from 45 to 65 pounds. On the Board of Trade regular ribs averaging not less than 30 nor more than 60 pounds are deliver-

able at a discount of 20 cents per 100 pounds; those over 70 and not over 80 pounds are discounted 30 cents per 100 pounds. Regular ribs are mainly shipped south either as dry-salt or bacon meat. The manufacture of this cut is confined largely to the winter months. It is used less extensively in proportion to other cuts than formerly but is still the leading side cut, over one-half the stocks of sides generally consisting of short ribs. Many are afterward converted into other cuts, as extra ribs, extra clears, backs and bellies, as determined by current prices of the various cuts. About one-fifth of the number of heavy hogs packed are cut into short ribs.

Jobbing or Rough Short Ribs consist of short ribs with the back-bone left in, the hog being centre-split, leaving equal parts of the back-bone on each side. They are sold at a discount of 2 per cent under regular ribs and must average not less than 30 nor more than 50 pounds for Board of Trade delivery.

Hard Short Ribs are made the same as Jobbing Ribs except that the hog is split so as to leave the back-bone all on one side. The side containing the back-bone is known as the Hard Side or Hard Short Rib and the other as the Soft Side, the latter being the same as the Regular Short Rib. They usually weigh 50 to 70 pounds, are cut from heavy packing hogs and are sold principally in the South as dry-salt pork.

Extra Short Ribs or Extra Ribs are made from Short Ribs by removing the loin. They average 35

to 50 pounds; 20 to 30 per cent of the stocks of sides usually consist of Extra Ribs.

Square Cut or English Short Ribs are the middles of hogs from which square shoulders and long-cut hams have been cut, thus making the side shorter than a regular rib, square-cut and with the feather of the blade-bone out. They are selected from the better grades of medium-weight packing hogs, and average 20 to 30 pounds. They are cured in English salt and handled like other English meats.

Short Clear Sides are made from regular short ribs by removing the ribs and cutting reasonably square at each end. They are graded and handled in the same manner as short ribs. Short Clears average 30 to 70 pounds and to grade regular must average not less than 35 pounds. Their use has declined to a large extent in recent years as compared with certain other cuts, and only 1 to 5 per cent of the stocks of sides are of this kind. It is primarily a domestic cut but is exported to some extent. Square-Cut Short Clears are the same as Square-Cut Short Ribs except the ribs are taken out.

Extra Short Clear Sides or Extra Clears are made the same as short clears except that the loin is also removed. They may be made from extra short ribs by cutting out the ribs. The pieces weigh 25 to 60 pounds, and must average not less than 30 nor more than 60 pounds to grade regular; 10 to 20 per cent of the stocks of sides are usually made up of this cut.

English Bacon Sides or long middles include both the side and shoulder, and in one instance (Wiltshires) the ham is also included. They are cured and packed as described under English Meats, and after arrival in Great Britain are usually made into rolled sides, which are dried for English trade, but in Scotland are usually smoked. American packers have discontinued manufacturing several cuts not mentioned below which were formerly used quite extensively.

Wiltshire Sides consist of the side, ham and shoulder left together in one piece; the blade-bone is taken out, foot cut off, the shoulder trimmed the same as Cumberlands, hip-bone taken out, not back-strapped, the belly trimmed smooth and even, and leg of the ham cut off below the hock joint. These sides average 40 to 70 pounds and are selected especially for thickness of lean meat with a light, even covering of fat from $1\frac{1}{4}$ to 2 inches thick, not exceeding $1\frac{3}{4}$ inches in the best grades. They are made exclusively from choice lean bacon hogs, and are the highest grade of English bacon sides. The use of Wiltshires has greatly declined in recent years. They are shipped principally to the south of England.

Cumberland Sides "have the end from which the ham is taken cut square; the leg cut off below the knee joint; the shoulder ribs, neck-bone, back-bone and blood vein taken out; breast-bone sawed or cut down smooth and even with the face of the side; and should not be back-strapped or flanked." They are

made from good and choice bacon hogs and average 20 to 60 pounds, but the bulk run 25 to 40 pounds. This is by far the leading export side cut, and being made in various grades and averages is suitable for converting into other English side cuts, such as



Wiltshire.

Cumberland.

Dublin.

LONG SIDES.

Yorkshires, Birminghams, Staffords and others which are no longer generally made in this country.

Long Rib Sides are made the same as Cumberlands except the shoulder bones are taken out and the leg cut off close to the breast. The average

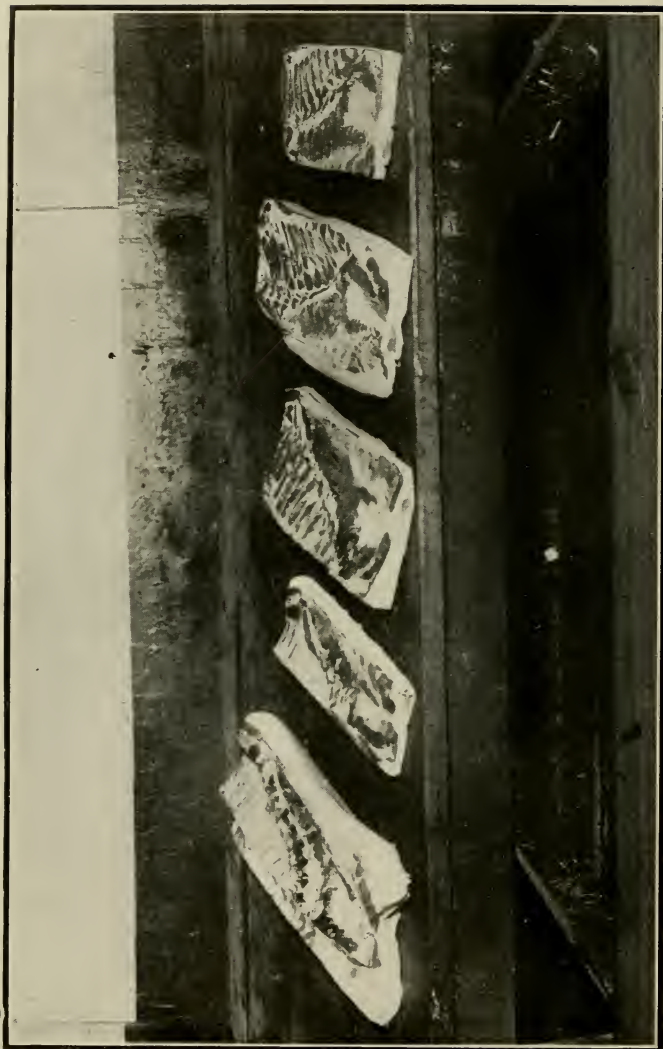
weight is 18 to 25 pounds. They are made from common to good bacon hogs, and shipped to Liverpool for distribution to Ireland and Wales.

Long Clear Sides are cut the same as long ribs and in addition have the ribs taken out. For English trade, they are made from good bacon hogs weighing 120 to 160 pounds dressed, and the sides weigh 18 to 26 pounds. For regular Board of Trade delivery they must average not less than 45 pounds. The latter are used in domestic trade and Continental Europe, and are made from the heaviest bacon hogs and from comparatively lean butcher hogs. This cut is used to some extent both in export and domestic trade, but much less than formerly. Extra long clears are made like long clears except that the loin is also removed. They are seldom used.

Dublin Middles are thin lean sides cut like Cumberlands and in addition the leg cut off close to the breast. They are made from light, common bacon hogs and pigs. The sides weigh 12 to 20 pounds.

Bellies.—The grades of this cut are Dry-Salt, Sweet-Pickle, Breakfast-Bacon and English Bellies.

Dry-Salt Bellies are made from short rib sides of mixed packing hogs by cutting off the back. For delivery on the Board of Trade they must be “well-cut and trimmed; no bellies that are coarse, bruised, soft or unsound shall be accepted.” However, they are not so closely trimmed as sweet-pickle bellies. They are made in averages from 10 to 45 pounds. About two-thirds of the stocks of bellies at Chicago usually consist of this grade. They are quoted as



Dry Salt Rib,

Sweet-Pickle Rib,

English Clear,

Sweet-Pickle Clear,

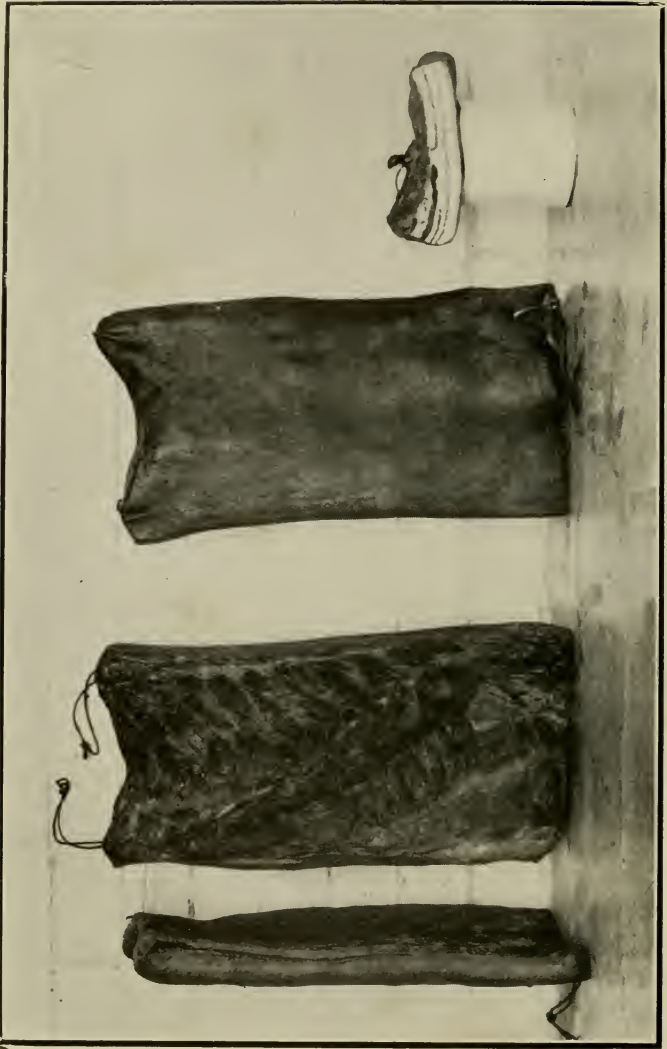
Fancy Clear.

MARKET BELLIES.

Dry-Salt Rib and Dry-Salt Clear Bellies, the latter having the ribs removed and being made usually from bellies weighing less than 25 pounds. When smoked they are known as Bacon Meats.

Sweet-Pickle Bellies are made from butcher, bacon and good packing hogs, being "well-cut and trimmed, to average, in lots, not to exceed 14 pounds." The edges are squared and trimmed more closely than Dry-Salt bellies. They are made in 6 to 14-pound averages, packed the same as sweet-pickled hams and sold either as sweet-pickled or smoked meats. About one-third of the supply of bellies are sweet-pickled. They are quoted both as Rib and Clear Bellies, the latter having the ribs removed.

Breakfast Bacon Bellies are clear bellies cut from bacon or light butcher hogs and selected with reference to firmness, color, proportions of fat and lean, smooth skin and general quality. They are trimmed still more closely than the regular sweet-pickled bellies. Selected bellies of this class weighing 4 to 10 pounds are known as Fancy or Special Breakfast Bacon Bellies and are made into the best brands of sugar-cured breakfast-bacon. They are carefully selected, dry-cured in air-tight boxes and smoked lightly. The second brand includes bellies that are too fat for fancy bacon, or which lack the necessary firmness of flesh and thin smooth skin. They weigh 4 to 16 pounds. The third brand is made from bellies weighing 6 to 18 pounds that are



SMOKED BREAKFAST BACON BELLIES (FIRST BRAND).

either slightly bruised, or too deficient in general quality for the second brand.

English Bellies are clear bellies weighing 10 to 20 pounds, cut from choice heavy bacon hogs and light butcher barrows, and selected for firmness and a large proportion of lean. They are cut square on all edges and packed as explained under English Meats.

Backs.—The grades of backs are Short Rib, Short Clear, Short Fat and Long Fat Backs.

Short Rib Backs are made from short rib sides by cutting off the belly; they therefore contain the loin, back fat and back-ribs but not the back-bone nor tenderloin. It is a dry-salt cut, weighing 25 to 45 pounds and is not commonly made. Hard Backs are made from hard rib sides, thus containing the back-bone. English Rib Backs are made from Square Short Ribs, and average 12 to 20 pounds.

Short Clear Backs are “made from the sides of smooth hogs from which the bellies have been cut, back-bone and ribs taken out and the lean left on, tail-bone sawed off even with the face of the meat, and trimmed smooth and square on all the edges.” They are cut from medium and heavy packing hogs, dry-salted and sold largely in Continental Europe. The weights run from 16 to 40 pounds. English Short Clear Backs are lighter than regulars, averaging 10 to 20 pounds, and are shorter at the butt end, being cut off in front of the hip-bone. They are packed like other English meats. Pickled Clear Backs are short clear backs of light weight and lean

quality. They weigh 6 to 10 pounds and are sweet-pickled, smoked and sold as Loin Back Bacon or Breakfast Bacon Backs.

Short Fat Backs are "made from the sides of heavy, well-fatted hogs from which the bellies have been cut, back-bone and ribs taken out and all the lean taken off, to be trimmed smoothly and properly squared on all the edges." This is one of the leading back cuts. It is made from packing and loin hogs when cutting pork loins, and is usually quoted as a dry-salt cut in 8 to 20-pound averages.

Export Short Fat Backs have the blade-bone taken out, are more closely trimmed and squared than domestic backs and are made principally in heavy averages, 16 to 40 pounds. Paprika Fat Backs are thin, light fat-backs, weighing 4 to 8 pounds. They are dry-salted and seasoned with paprika.

Long Fat-Backs consist of "the upper half of the side cut through the centre of the ribs from the ham to and including the shoulder, with the loin and blade-bone taken out, trimmed smoothly and squared on all edges." It is a dry-salt cut, not so commonly made as formerly and used only for export trade.

Loins.—Loins, consisting of the back with the fat trimmed off, are sold either as Regular Pork Loins or as Loin Rolls.

Pork Loins are made from sides of loin hogs, with the belly and back-fat cut off; they contain the back-bone, back-ribs and tenderloin, and have but a small amount of fat (one-fourth to one-half inch) on the outside. The loin is the leading fresh pork



English Rib.

English Clear.

Short Fat Back.

Sweet-Pickle Clear.

COMMERCIAL TYPES OF BACKS.

cut, and as it is retailed entirely in the form of chops and roasts, it must have reasonably good shape, bright color, firm, fine-grained flesh and good quality of bone. Loins are made principally from butcher hogs, but also to some extent from good packing and heavy bacon hogs. The weights of regular pork loins are 8 to 18 pounds and the price usually varies inversely with the weight, except occasional loins that are graded No. 2 on account of dark color or coarseness of flesh and bones; 14 pounds is the heaviest average generally used for fresh trade, and a few are made as light as 4 to 6 pounds. Extra or Long Pork Loins include, in addition to the regular loin, the top or lean butt of the shoulder, but this cut is seldom made.

Tenderloins consist of short round muscles lying underneath and on each side of the back-bone; they are attached to the slip-bone and extend from the loin butt almost to the last rib. They weigh one-fourth to one pound each, but those weighing three-fourths pound or over are most extensively used. They are cut from hogs that are too heavy and rough to yield regular pork loins, and from which short ribs, mess pork and boneless loins are made. The tenderloin is sold only as a fresh cut, and commands a higher price than any other fresh pork product.

Loin Rolls are made from heavy loins (15 to 22 pounds) by boning them completely, tying three boneless loins together lengthwise in the form of a roll, curing in sweet pickle, smoking and boiling. Light No. 2 loins are also packed in this manner in

smaller quantities. Loin rolls are used by restaurants and delicatessen shops.

Shoulders.—The standard grades are Rough, Regular, Picnic, New York-cut, Skinned, Square, New Orleans-cut and Boneless Rolled Shoulders.

Rough Shoulders are untrimmed shoulders as cut from the hog, separated from the side between the first and second ribs and with the jowl cut off square. They are quoted as fresh meats but are not extensively used.

Regular Shoulders are “cut as close as possible to the back part of the forearm joint without exposing the knuckle (leaving 2 ribs on the shoulder), butted off square on top, the neck-bone and short ribs taken out, neck squared off, blood vein lifted and cut out, breast flap cut off and foot cut off on or above the knee joint.” They are made principally from hogs that are too heavy and rough for New York style shoulders, and at times when the supply of Picnics exceeds the demand. About 15 per cent of the stocks of shoulders generally consist of Regulars, of which about one-third are handled as dry-salt shoulders, averaging 15 to 20 pounds, and about two-thirds as sweet-pickled shoulders averaging 12 to 16 pounds. Sausage Shoulders are regular-cut shoulders which are unsuitable for dry-salt or sweet-pickle because of being trimmed to remove bruises, cut from shoulder-stuck hogs, or otherwise deficient, and are used for the purpose which their name indicates. Bladed Shoulders are cut the same as Regulars except the shoulder-blade is taken out and the

corners rounded. Comparatively few are cut in this manner.

Picnies or Calas (formerly termed California hams) are cut $2\frac{1}{2}$ ribs wide, trimmed and packed as follows: "Shank cut off above the knee joint, trimmed as full on the face (lean surface) as possible, butt taken off to the edge of the blade, well rounded at the butt in the shape of a ham, breast flap taken off, and trimmed close and smooth, reasonably uniform in size, and to average, in lots, not to exceed 12 pounds; 300 pounds block (green) weight shall be packed in each tierce. Pickle the same as used for hams." They are cut from good packing and butcher hogs, averaging 4 to 14 pounds, but principally 8 to 12 pounds, and are sold almost entirely as sweet-pickled, smoked and boiled meats. The lighter averages (4 to 8 pounds) are sometimes termed Boston Shoulders, and were formerly butted shorter than Calas and only slightly rounded; but Chicago and other western packers now trim them like Calas and designate both as Picnies. About 85 per cent of the wholesale supply of shoulders is made into Picnies. Skinned Picnies are made from the fatter grades of Picnies by removing the skin and trimming the fat off within one-half inch of the lean. They average 6 to 10 pounds, and are sold largely as Boiled Meats.

New York-cut Shoulders are cut two ribs wide, butted one inch from blade-bone, trimmed smooth, neck and breast flap cut off, shank cut off between knee and brisket; 8 to 14-pound grades are made

Rough.

New York.

Skinned.

New Orleans.

Square.

MARKET TYPES OF SHOULDERS.



for domestic trade and the bulk weigh 10 to 12 pounds, but heavier weights up to 18 pounds are exported. They are made principally from butcher and packer hogs, and are quoted as fresh, smoked and sweet-pickled meats. They are not as extensively used as formerly in proportion to other cuts.

Skinned Shoulders are cut similar to New York-cut Shoulders and in addition the skin is taken off down to the shank and the fat trimmed off close to the lean. They weigh 6 to 16 pounds, and are sold fresh, sweet-pickled and smoked. They are the leading fresh shoulder cut used in city retail trade. Skinned shoulders with the shank cut off close to the breast are termed Chicago Shoulders, or Skinned Shoulders, hock off.

Square or 3-Rib Shoulders are cut three ribs wide, squared on all sides, neck-bones out, breast flap off, foot cut off at the knee joint, butted just above blade-bone, and so trimmed as to expose the lean as much as possible. This is the leading English shoulder cut, and is made in averages from 10 to 20 pounds.

New Orleans-cut Shoulders are made $1\frac{1}{2}$ ribs wide, smooth and rounded on neck end, part of shoulder butt left on and neck-bone out. They are cut principally in 12 to 14-pound averages, but are also made from 10 to 16 pounds, from shoulders that are too rough and fat to make New York-cut or Picnic Shoulders. This is a dry-salt cut.

Boneless Rolled Picnics are made from heavy Picnics by lifting the skin, removing the surplus fat

and the bone, pressing or rolling and tying with cord in the form of a roll in the same manner as rolled hams. They are also made from skinned Picnics. Boneless rolled shoulders are made similarly from regular shoulders. They are sold as boiled meats.

Butts and Plates.—Butts are cut from the end or top of the shoulder and from the jowl. Plates are made from shoulder butts. The various grades of these cuts are Boston Style, Milwaukee Style, Boneless, Buffalo Style, New York Style, Picnic, Dry-Salt and Square-Cut Butts; Regular Plates, Clear Plates and Back Plates.

Boston Style Butts are the ends or top pieces cut from heavy shoulders when making Picnics, the neck-bone, ribs and surplus fat being removed and the piece trimmed smooth. They include the end of the shoulder blade. Average weights are 3 to 7 pounds. They are principally barreled and exported to Germany, Denmark and other European countries, but are also sold fresh for domestic retail trade.

Milwaukee Style Butts are the same as Boston butts with the neck-bone and rib left on.

Boneless Butts or Lean Butts (also termed Cala Butts) consist of the lean, boneless portion of Boston butts between the blade-bone and neck-bone. When sweet-pickled and smoked like hams this cut is known as a Cottage Style butt.

Buffalo Style Butts are cut the same as boneless butts except that the neck-bone is left in. They are used fresh.

New York Style Butts are shoulder butts cut

from Picnics of the thinner and lighter grades. They contain the neck-bone, fat and lean, and are mainly plain-pickled.

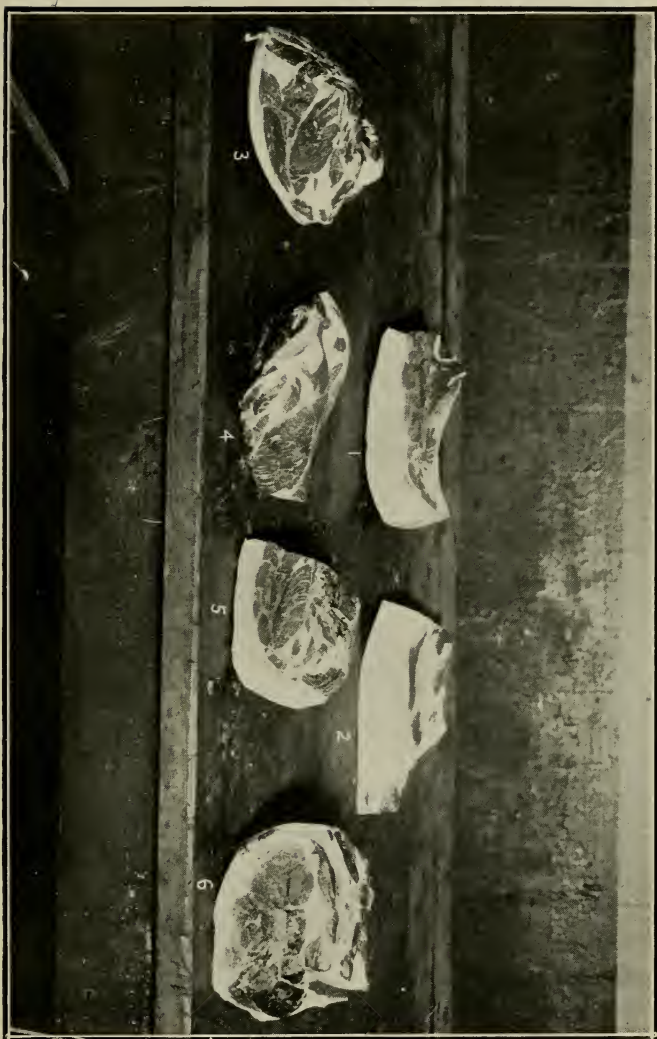
Picnic Butts are Picnics from which the surplus fat and the skin are removed and the shank cut off close to the breast. They are not trimmed as closely as regular Picnics.

Dry-Salt Butts are made from the jowl (lower part of the neck and cheek), with the edges trimmed smooth and the piece pounded flat. They weigh 3 to 5 pounds and are usually packed as their name indicates but are sometimes barreled. Virginia Style jowls are made from the smaller end of the lower jaw including the teeth, and are made both tongue in and tongue out. They are sugar-cured and smoked, but are not extensively made.

Square-Cut Butts are also made from the jowl but are more closely trimmed and squared. They average 2 to 4 pounds and are dry-salted or barreled.

Regular Plates are made from shoulder butts by removing a boneless butt, thus making a fat piece with a facing of lean, containing the end of the blade-bone, and weighing 6 to 12 pounds. They are packed either as dry-salt or barreled pork. When made with the blade-bone out they are known as Antwerp Backs.

Clear Plates are made from shoulder butts by removing a Boston butt, and are a clear fat cut, weighing 4 to 8 pounds. They are generally dry-salted but are barreled to some extent.



1. Regular Plate. 2. Clear Plate. 3. Boston Plate. 4. Boneless Butt. 5. New York Butt. 6. Picnic Butt.

BUTTS AND PLATES.

Back Plates are made from long fat-backs, cut into keystone-shaped pieces weighing $3\frac{1}{2}$ to 10 pounds. They are both barreled and dry-salted.

Miscellaneous.—The cuts described under this head consist principally of barreled pork and other products made from sides and shoulders of packing hogs. They may be grouped as follows: Mess Pork, Belly Pork, Back Pork, Shoulder Pork, Spareribs, and Trimmings.

Regular Mess Pork is described as “made from sides of well fattened hogs, split through or one side of the back-bone, and equal proportions on both sides, cut into strips of reasonably uniform width, properly flanked and not backstrapped.” Backstrapping refers to trimming a strip of fat from the edge of the side, above the back-bone. The regular proportion of flank and shoulder cut must be included. The strips average about six inches in width, and not over sixteen pieces may be packed in a barrel for regular delivery. Mess Pork is made from rough and heavy packing hogs and occasionally from heavy loin hogs. During the early years of the packing industry about one-third of the wholesale pork product consisted of mess pork, but it has been largely replaced by other cuts during recent years, and is now only two or three per cent of the supply. Approximately one-half of the Barreled Pork supply is Mess Pork. On the Board of Trade it is quoted simply as Pork. Mess pork packed between Oct. 1 of one year and Sept. 30 of the succeeding year is new pork until Jan. 1 of the following year,



A MESS PORK SIDE.

and is thereafter termed old pork. Mess pork made during December, January and February must have been packed at least ten days before delivery, and that delivered during the period from March to November, inclusive, must have been packed at least 30 days before delivery to grade regular. It is barreled and shipped principally to the southern states, northern lumber camps and South America. Short-cut Mess Pork is described in connection with Back Pork.

Light Mess Pork is "made from the sides of reasonably well fattened hogs; and in all other respects to be cut, selected and packed the same as mess pork, except that as many as 22 pieces may be put into each barrel." It is made principally from medium packing hogs.

Prime Mess Pork is made from the shoulder and side, containing the back-bone and ribs, cut into square pieces of about 4 pounds each. The shank is cut off close to the breast. In making this cut the side is split lengthwise, the back cut into about six pieces and the belly into four. It is made from light packing hogs.

Extra Clear Pork is "made from the sides of extra heavy, well-fatted hogs, the back-bone and ribs to be taken out (the same as short clear sides), the number of pieces in each barrel not to exceed 14, and in all other respects to be cut, selected and packed in the same manner as mess pork." This cut is not extensively made.

Clear Pork is "made from the sides of extra heavy, well-fatted hogs, the back-bone and half the ribs next the back-bone to be taken out, the number of pieces in each barrel not to exceed 14, and in all other respects to be cut, selected and packed in the same manner as mess pork." It is no longer in general use.

Loin Clear Pork is "made from the sides of medium-weight packing hogs, the loin, back-bone and back ribs being removed and belly ribs left in." It consists of extra short ribs cut into strips, and is also known as Long-Cut Clear Pork. The pieces average five inches in width. It is barreled like mess pork and sold especially to New England trade.

Regular Belly Pork consists of heavy, fat rib bellies cut into 5-inch widths and packed as plain-pickled pork in barrels containing 50 to 60 pieces. This pork is made from the same grade of bellies as Dry-Salt Rib Bellies.

Brisket Pork Rib is made by cutting a 5-inch strip from the brisket end of heavy rib bellies (14 to 20-pound average) and packing like other barreled pork. The pieces average about 4 pounds each. This cut is made only when it is desired to reduce the weight of heavy bellies. Clear Brisket Pork is made in the same manner as the above except the pieces are cut from clear bellies. Fancy Clear Pork is a strip cut from the brisket end of fancy breakfast bacon bellies, averaging 1 to 1½ pounds per piece. It is either barreled or sugar-cured and smoked.

Lean Belly Pork consists of lean clear bellies, 13 to 15 pounds average, cut into three pieces each and barreled in plain pickle.

Regular Back Pork (Short-Cut Mess, or Family Back Pork) is described as "made from the backs of well-fatted hogs, after bellies have been taken off, cut into pieces of about 6 pounds each, and in all other respects to be cut, selected and packed in the same manner as mess pork." This cut contains the loin, back-bone and back ribs, with tenderloin out, and the pieces are cut 6 inches wide, averaging 4 to 6 pounds.

Clear Back Pork is "made from the backs of heavy, well-fatted hogs, after bellies have been taken off, and back-bone and ribs taken out, cut into pieces of about 6 pounds each, and in all other respects to be packed in the same manner as mess pork." In other words, it consists of Short Clear Backs cut into strips about 6 inches wide, and is the same as Regular Back Pork with the rib removed. It is sometimes called Loin Clear Pork. The pieces average 2 to 7 pounds.

Fat Back Pork or Short-Cut Clear Pork is made from short fat-backs by cutting them into 5-inch strips. The pieces average from 2 to 7 pounds and are packed like mess pork. Speck is made from fat-backs, cut into strips, cured in plain pickle and seasoned with pepper.

Ham Butt Pork (Loin End or Rump Pork) consists of triangular pieces cut from the ham end of short clear backs or sides and includes a portion

of the tail-bone. It is made when cutting short-cut hams and English sides, or when it is desired to reduce the weight of heavy side or backs. It is packed in barrels, the pieces averaging 3 to 4 pounds.

Shoulder Pork consists of the following products made from shoulders and butts:

Extra Prime Pork is "made from heavy untrimmed shoulders cut into 3 pieces; the leg to be cut off close to the breast, and in all other respects to be cut, selected and packed in the same manner as mess pork." The pieces average about 4 pounds. This and the preceding cut are not used as extensively as formerly.

Boston Style Butt Pork is made from Boston Style Butts averaging 4 to 7 pounds, packed in plain pickle.

Bean Pork or Clear Butt Pork is made from the jowl or fat cheek of the hog, cut square, trimmed smooth and averaging 3 to 4 pounds, packed in plain pickle.

Spareribs consist of the ribs trimmed from the carcass or side with as little lean as possible. They are termed full-sheet, half-sheet and back-bone spareribs according as they are cut from full sides, bellies or backs respectively. They are essentially a fresh pork product and are sold in retail markets especially in fall and winter, for which purpose half-sheet ribs are principally used. Spareribs are also quoted as sweet-pickled, smoked and dry-salt meats. They are packed in limited amounts in sweet pickle at times when the demand for fresh spareribs is dull;

dry-salt spareribs are taken from dry-salt sides and bellies when making them into clear cuts after curing. Both pickled and dry-salt spareribs are smoked to a limited extent.

Various other meats are handled and quoted similarly to spareribs. Hocks consist of the shank or foreleg cut from the shoulder, including the portion between the breast and knee. They are sold either fresh or barreled. Back-bones, neck-bones and blade-bones are to some extent sold fresh like spareribs, but are usually tanked.

Trimnings are of two grades: Special Lean, or A grade, and Regular or B grade. Special Lean or Berliner Trimnings consist of the larger pieces of meat with fat cut off and are used especially for making Berliner sausage. The regular grade is made up of small pieces of fat and lean, miscellaneous in shape and quality, and contains about 40 to 50 per cent fat. Both grades are almost entirely utilized in sausage manufacture.

LARD.

From one-tenth to one-third of the hog carcass is made into lard in large packinghouses, the proportion varying with the relative price of lard and grade of hogs. The standard grades are Kettle-Rendered Leaf, Kettle-Rendered Neutral, Prime Steam, Refined and Compound Lard. They differ as to the kinds of fats they contain, methods of rendering, color, flavor and grain.

Kettle-Rendered Leaf Lard.—This consists of leaf fat only, rendered at about 248° F. in open-jacketed kettles, without the addition of water and without subsequent refining. It is the whitest in color and finest in grain and flavor of all grades of lard. Kettle-rendered lard is distinguished from other kinds by the wavy or fluffy appearance of the surface, known as a crinkly top, and this is characteristic especially of leaf lard. It is sold principally in pails of various sizes for retail trade. Most packing firms do not render pure leaf lard but make the leaf into Neutral. Raw leaf is also sold fresh to butterine manufacturers and is used to some extent by retail trade.

Kettle-Rendered Lard.—This grade is made from back fat with or without a proportion of leaf or "leaf scraped" lard (seldom exceeding 20 per cent), and not over 5 per cent of lard stearin. Lard stearin is the residue left after pressing the oil from lard. Having a high melting point, it is usually mixed with lard during the summer months or when shipping to a warm climate. Ham-facing fat and fat trimmings are also used at times. It is rendered in either open or closed kettles but not under pressure nor in contact with live steam. The open-kettle product is sometimes branded Country Style Lard. This is the highest grade of lard made in most packinghouses, and is excelled in whiteness, grain and crinkly appearance of the surface only by genuine leaf lard. Kettle-rendered lard more readily becomes rancid than refined lard, hence flavor and

keeping qualities are especially important in this grade. It is made in comparatively limited quantities, and is packed in 3 to 50-pound pails for retail trade, 50 to 80-pound tubs, and tierces.

Neutral Lard.—Neutral Lard is made from leaf or back fat melted in water-jacketed open kettles at about 128° F., at which temperature the fat partially liquifies without cooking. No. 1 Neutral is made from leaf fat only. When drawn off and strained the melted fat is tasteless, free of acids and impurities, smooth-grained and remains unchanged in odor and color. It is sold in tierces and is used principally in the manufacture of butterine or oleomargarine. This grade of lard is largely exported, Rotterdam being the principal foreign market for it. No. 2 Neutral lard is made from back fat melted in the same manner as the No. 1 grade. It is not as white in color nor as fine in grain but is used for the same purposes when No. 1 Neutral is high in price.

Prime Steam Lard.—Prime Steam Lard is made from fat trimmings (ham, shoulder, belly, jowl and head fats), internal or killing fats and other fat parts, sometimes including entire fat-backs and jowls, rendered in closed tanks under about 40 pounds direct steam pressure (240° F.) without refining, stirring or bleaching. It is darker-colored and coarser-grained than other grades of lard, and is the form in which hog fats can be most economically stored and shipped. It is stored in tanks and tierces, and shipped in tierces or tank cars. Prime steam lard is refined before using, being con-

verted into other grades of lard or used in Compound. Nine-tenths or more of the lard made at Chicago is of this grade. For delivery on the Board of Trade "it must have proper color, flavor and soundness for keeping, and no material which has been salted must be included. Prime steam lard of superior quality as to color, flavor and body may be inspected and labeled as 'Prime Steam Lard, choice quality.' " When rendered from cured fats such as sweet-pickled ham and shoulder fat, or for other reasons defective in color, flavor or grain, it is graded as No. 2 Steam Lard, being darker in color and coarser in grain than the regular grade.

Refined Lard.—Refined Lard is made from Prime Steam Lard by a bleaching and stirring process, consisting of rapid agitation with fuller's earth at about 180° F., followed by pressing through filter cloths and chilling. A proportion of lard stearin, not exceeding 5 per cent, may also be added. If oleo stearin, tallow or more than 5 per cent of lard stearin be added, the product may not be labeled Pure Lard, and the added fats must be named on the package. It is sold in tierces, barrels, cans and pails, and is packed in 28 and 56-pound boxes for export.

Compound Lard.—Compound Lard or Lard Compound is a mixture of lard, stearin or other animal fat, and vegetable oil (usually cottonseed oil). All the ingredients must be named on the label, and the proportion of lard must equal or exceed that of any other one of the ingredients. Compounds, or lard substitutes, differ from compound lard in that they

contain little or no lard but are composed of oleo stearin, lard stearin and tallow mixed with refined cottonseed oil. The proportion of cottonseed oil is usually 80 to 85 per cent. The amount of this product manufactured is approximately equal to that of lard. It is packed in the same kinds of receptacles as refined lard.

Small Parts or Offal.—The head is sometimes marketed fresh or cured in pickle. It is, however, generally tanked for lard. The cheek meat is the lean portion of the head next to the cheek bone. It is trimmed out when the heads are tanked and used for sausage meat. The tongue is usually cured in pickle and sold as pickled tongue, or canned and marketed as Canned Luncheon Tongue. The snouts and ears are usually sold fresh. If there is no demand they are tanked for lard.

The brains and kidneys are sold fresh. The pluck, comprising the liver and heart, is sometimes sold fresh. When there is no demand the liver is tanked for fertilizer and the heart used in sausage meat. The lungs are tanked for fertilizer. The intestines are cleaned and used as sausage casings. The feet are usually pickled, cooked and spiced and sold as cooked and spiced pigs' feet. At other times they are tanked for lard. The hair and bristles are usually sold to brush or mattress manufacturers. The blood is tanked and afterwards dried out for fertilizer. The neck-bones and back-bones are sold fresh or tanked. The spareribs and tails are sold fresh or pickled.

BUTCHERING AND CURING.

The following is from O. W. Browning, of Iowa: Hogs should be killed with a knife and hung up with pulleys before or immediately after sticking. Have the water at about 155° F. After removing the hair hang the hogs up on a singletree and thoroughly wash and scrape the carcasses, using a scrubbing brush. After cutting remove the leaf fat and split out the back-bone. This leaves the sides in nice shape to cool and handle. Allow the carcass thoroughly to cool before cutting up. To make choice lard remove the rind and cut the fat into small pieces or run it through a chopper. Remove every bit of lean from the fat. Cook the fat on the kitchen stove in common dinner pots. The rinds can be cooked in the oven in a roasting pan. Five pounds of pork fat will make 4 pounds of lard.

Sausage.—To season sausage use 1 pound of salt, 2 ounces of pepper and 1 or 2 ounces of sage. The sage should be dried and pulverized. Mix the salt, sage and pepper before adding to the sausage. The quantity given is for 45 to 50 pounds of meat. Meat or sausage fried down fresh should be well-cooked and covered with melted lard. Hams and shoulders that have been cured and smoked may be fried down for summer use, but do not require so much cooking; they should be well covered with lard to exclude air.

Sugar-Curing Pork.—Water, 9 gallons; sugar, 4 pounds; salt, 14 pounds; saltpetre, 3½ ounces; lye, 4 teaspoonfuls. Boil together water, salt and lye; after skimming, add the sugar and saltpetre. Pack the meat in a barrel, rubbing each piece with salt and sprinkling some between the layers. After three days put on the brine. The meat should remain in brine from three to six weeks, according to the size of it. After the meat is taken from the brine it should be allowed to dry several days before smoking.

To Make Liver Wurst.—Boil the liver with about an equal weight of head meat, including the fat. After it is fairly well done, run through a food chopper while yet warm, season with salt and pepper and pack it in a crock or into rolls. It should be sliced and fried for use. Boil the tongue; when it is cold, slice and pack in a jar with alternate layers of sliced onions. Cover with vinegar.

BACON CURING.

There are many causes of failures of farmers and their wives in curing meats and making sausage and other toothsome viands from well-bred, well-fed pigs, writes L. N. Bonham in *THE BREEDER'S GAZETTE*. The runts and scalawags, the stags and worn-out old sows go to the packer, and yet with choice thrifty young pigs available on the farm it is no credit to us farmers that we call for bacon with that flavor with which the big packers tickle our palate. The farmer who raises the pigs, good, bad and in-

different, that go over the scales to the packinghouse should be able out of his selects to make bacon and hams that are as much better than the packer's output, as selected pigs are better than the average of the drove. Be the skill of the killer and curers ever so great, they make their best products out of selected animals. For best bacon they do not want the biggest producer of lard, but lard is such a ruling article in the cuisine of many families that they butcher only those with age and weight to yield lard in abundance. From such hogs even the most skillful curers can not make the choicest cuts of highest-priced bacon. We hear therefore of the two classes of hogs—the bacon hog and the lard hog. But as the latter is the hog that brings the farmer the best market for his corn, the market is often short of first-class bacon hogs. They come from the light type, be they young of the lard hog or older of the bacon type.

If the claims of the breeders of the bacon breeds are correct, it follows that if we are to have in our farm smokehouses the best bacon we must raise hogs of the bacon type. Fortunately, however, for the raisers of the more growthy hogs very choice bacon and hams can be made from them if they are killed before they get too heavy—say at five to six months old, weighing after six weeks' feeding from 150 to 190 pounds. Unless the family believes no bacon is good that is more than an inch thick it can find just as delicious and nutty cuts from sides of young hogs weighing from 200 to 250 pounds, but

in every case the quality of the bacon depends on the feeding as well as on the curing. Farmers seeking bacon with the flavor the packer turns out should be careful to select for family use the kind of pig that can furnish desirable cuts for bacon. The next step is to kill and cure as skillfully as the successful packer. There are scores of recipes by which toothsome bacon is cured. There is not so much in the recipe as the inexperienced imagine. The right kind of a pig properly killed and handled with scrupulous neatness, and the meat well cooled out before going into a clean cask or jar, skin-side down, and covered with a brine made according to a simple old recipe, may turn out bacon and hams to suit even the most fastidious. The cure may be as mild as desired simply by leaving the meat in a shorter time; the time may vary from three weeks to six, according to the thickness of the cuts and the degree of mildness desired. There is a limit, however, to this mild cure, if the bacon is to be kept long, in which case the meat must remain in pickle five weeks or even six weeks, if the bacon is to be kept all summer.

Packers can make a quicker turn of their products by shortening the time to cure it, and this mild curing has appealed to popular taste, so that both packer and consumer are pleased. This extremely mild cure would be all right if the grocer or butcher could turn it over to the consumer soon enough to be consumed before it begins to lose that delightful sweetness so much like the taste of cracklings our mothers turned out after making lard. The farmer

who seeks the flavor of the thin, mild-cured bacon "the packers tickle the palate with" can have it in highest excellence by killing a choice pig every month and giving the mild cure; but if he tries to keep such bacon into the summer months he must keep it in cold storage. Tastes differ. Before packers created this taste for their mild cure of thin bacon some tastes called for the rich old cure that resulted in bacon that tickled their palates, even after it hung in the kitchen or smokehouse all summer or fall.

The meat must be properly dressed and cooled before going into the packing barrel or jar. The receptacle must be so thoroughly cleaned, scalded and disinfected as to be absolutely free from taint or mold. One germ is enough to start ferment, or the fresh meat may have lacked the clean handling which is essential to highest success. Gilt-edged ham and bacon, like gilt-edged butter, only comes from proper handling of the meat from sound healthy properly-fed hogs. Rough handling of the animal sometimes causes bruises, or twisting the hind leg in scalding may break a ham bone and cause the loss of the bruised cut or the injured ham; and the ferment starting in these places may lead to injury or taint of all the cuts in the pickle. Because of this danger many have had better success in dry-curing, in which process each cut is treated by itself and its juices do not enter other cuts.

Electricity has been found so thoroughly to destroy any germ that may enter the packing vat with

the meat that the meat will keep sweet indefinitely and flies or ham beetles will not attack it. Unfortunately the outfit costs too many hundreds of dollars for farmers to adopt it. Salt enough will save even carelessly-handled meat, but it may make the finished product unpalatable and hard; hence the need of a recipe to limit the salt and other ingredients to the right amount.

THE RECIPE.

The recipe here given has proved adequate where the packing vessel and meat are not at fault and are kept at even and rather low temperature during the curing: Well or cistern water pure enough to drink will do for making brine. For every gallon of water needed to cover the meat, add $1\frac{1}{2}$ pounds of salt, $\frac{1}{2}$ pound of granulated or New Orleans sugar, $\frac{1}{2}$ ounce of saltpeter and $\frac{1}{2}$ ounce of crude potash. The saltpeter is used to give a pink color to meat. Crude potash is made from wood ashes, and is not often carried by druggists, since concentrated lye has become a staple form of potash for family use. Potash breaks down fibre and is supposed to make meat less hard that is saturated with salt. Heat, skim and cool before pouring over the meat. The meat must be weighted down before pouring on the brine, and there must be enough brine to cover the meat so the top layer may be at least an inch under the surface of the brine. As evaporation will reduce this, it is better to have the brine two inches deep over the meat. The choice of a weight to hold

down the meat is important, as it is easy to introduce a foreign substance that will affect the flavor or start fermentation. Never use pine boards. If any board is used to carry the weight let it be of oak—some staves of a packing barrel. Scald the board or weight to disinfect it thoroughly. We use vitrified bricks, as they are easily kept clean and aseptic. If stone is used, scour with a brush and scald it before putting it on the meat. Leave the meat in the brine five weeks, unless the hams are very heavy, in which case leave another week. Bacon and lighter hams may be lifted after four weeks, if a mild cure is desired. Heavy hams must have more time. Let the meat hang in the smokehouse a day or so before starting the smoke.

Smoking Cured Meats.—Use hickory and corn cobs to make smoke for the best flavor; never permit enough heat to make grease drip from the hams. Low fires, smothered down, give best results. If the smokehouse is fly-proof, the meat will keep as well there as any place; but a fly-proof smokehouse is so rare that the meat must be covered before the flies or ham beetles appear. Wrapped in paper free from printer's ink, and slipped into a muslin sack and hung in a cool place, they will be good until used. Here is the rub: they will mold on the surface. The only sure way to prevent that is to dip in a preparation which prevents mold and evaporation. This, we are unfortunately compelled to say, has not yet been proved successful. It is therefore evident that we have a great deal to learn about

the art of curing and preserving meats on the farm. Here is an inviting field for some of our experiment station people.

LIQUID SMOKE.

Liquid smoke may be satisfactory to some persons, but if gilt-edged products are aimed at the curer will take a little more time and smoke in as low a temperature as possible to keep up a smoke from sound hickory or sugar tree replenished with corncobs as needed to keep a slow fire. Granting that the liquid creosote is as palatable as that derived from the smoke of sweet sound hickory, the liquid cannot be applied as evenly with a brush as with smoke.

Fried-down meat molds. To prevent mold and injury by flies and ham beetles some housekeepers slice, fry and pack in jars and cover with fryings or melted lard. This is a success when there are no airspaces left between the slices, as there will be if the slices are allowed to cool and the lard is not hot enough to fill between the slices. If the slices are placed in the jar directly from the skillet and enough hot lard poured over at once to cover the layer, the lard will enter between the slices to exclude the air. The loss of weight in hams, bacon and other cured meats by evaporation varies from 5 to 20 per cent. This shrinkage the consumer pays and it is one of the inevitable losses which fortunately does not tell of depreciation of the food value of the cut. The covers of hams and bacon are inedible and expensive

to the consumer and are of questionable value as conservers of quality. The packer has yet to learn how to cover his meats to prevent mold and shrinkage. These coverings are tolerated by the consumer as a necessity for protecting the meat against the carelessness of middlemen and from ever-present insects whose end seems to be to defile edibles and spread disease.

Keeping Lard.—To prevent lard getting fatty keep in a cool place and keep the surface of the lard in the vessel as even as possible, free from pits or holes which expose a large surface to the atmosphere. Pure hog's lard melts at a lower temperature than compound lards in which stearin may be used to prevent ready melting.

RECORD ASSOCIATIONS.

Following is a list of the associations which register pure-bred hogs, and the names and addresses of the secretaries:

American Berkshire Association—Frank S. Springer, Springfield, Ill.

American Chester White Record Association—Ernst Freigau, Dayton, O.

American Duroc-Jersey Swine Breeders' Association—T. B. Pearson, Thorntown, Ind.

American Essex Association—F. M. Srout, McLean, Ill.

American Poland-China Record Co.—W. M. McFadden, Pedigree Record Building, Union Stock Yards, Chicago.

American Tamworth Swine Record Association—E. N. Ball, East Lansing, Mich.

American Hampshire (Thin-Rind) Swine Record Association—E. C. Stone, Armstrong, Ill.

American Yorkshire Club—H. G. Krum, White Bear Lake, Minn.

Cheshire Swine Breeders' Association—E. S. Hill, Freeville, N. Y.

Improved Small Yorkshire Club of America—F. B. Stewart, Espeyville, Pa.

National Chester White Record Association—Thos. Sharpless, West Chester, Pa.

National Duroc-Jersey Swine Breeders' Association—J. R. Pfander, Peoria, Ill.

National Mulefoot Hog Record Association—W. H. Morris, Indianapolis, Ind.

National Poland-China Record Association—A. M. Brown, Winchester, Ind.

O. I. C. Swine Breeders' Association—J. C. Hiles, Cleveland, O.

Standard Chester White Record Association—W. H. Morris, Indianapolis, Ind.

Standard Poland-China Record Co.—George F. Woodworth, Maryville, Mo.

Victoria Swine Breeders' Association—H. Davis, Dyer, Ind.

RATIONS IN MANY STATES.

In response to a letter sent to each agricultural experiment station in the United States asking for details of the most resultful and economical rations for (1) weanling pigs, (2) brood sows during pregnancy and after farrowing, (3) boars prior to and during service, and (4) fattening shotes up to 200 to 300 pounds, the following replies were received:

FLORIDA.—By Prof. John M. Scott of the Florida Experiment Station, Gainesville: The feeding of young pigs in Florida does not differ much from the method followed in other states. The Florida farmer has quite a variety of feeds to choose from. Apart from the feed one of the first considerations for the successful raising of pigs are cleanliness and healthfulness of the place in which they live. This means supplying them with good shade and water, running water by preference, during the summer season. A hog is no better than its surroundings. The farmer who compels his pigs to live in a little filthy pen will produce only a few hogs and scrubby ones at that. After giving the hog a good home supply it with plenty of good nutritious feed. The feed for young growing pigs should be concentrated. A pig has a comparatively small digestive tract, and cannot handle bulky feeds to good advantage. For pigs weaned when from 8 to 10 weeks old the following feed should prove satisfactory for rapid gains; skimmilk, crushed corn and shorts, in equal parts by weight. This is to be fed at the rate of about 1 pound of the mixture for every 10 pounds of live weight. Add to this all of the green material the pigs will eat. As they become older shelled corn or ear corn can be substituted for crushed corn. Cowpeas, peanuts, ground velvet beans and soybeans will be found good substitutes for the skimmilk and shorts.

Of course the pigs should be supplied at all times with all the green forage they will eat. For this purpose sorghum is one of the best crops, for it comes on early in the spring and will supply green feed until frost. Other good forage crops that can be had during the summer, fall and winter are cowpeas, corn, beggarweed and Dwarf Essex rape. The rape planted in September will furnish grazing in from 8 to 10 weeks and should continue to give good pasturage until about April 1. Japanese cane will furnish an abundance of succulent feed from the middle of November until early in March.

In feeding green forage it should be remembered that it cannot be used to replace all of the grain. In fact it will replace but a small amount of grain. It will stimulate the appetite, and keep the digestive organs in good working order, which are two important considerations to keep in mind, if we are to obtain good results in feeding.

IDAHO.—By Prof. E. J. Iddings of the Idaho Experiment Station, Moscow: The feeding of pigs should begin long before weaning time. We have found it a good plan in Idaho to start them to drinking skim milk and nibbling at nubbins of corn. As weaning-time approaches a good pasture of clover, alfalfa or rape is provided and the pigs given all they will eat of a grain ration. Shorts, middlings, barley, sifted oats, corn, some tankage and feeding flour are excellent pig feeds. The pigs have all the grain they care to eat along with the pasture and are kept growing at the age when gains are secured most cheaply.

We have had excellent results in wintering brood sows on a steamed mixture of one-half alfalfa hay, one-fourth corn and one-fourth barley. Summer pasture should form a large part of a sow's ration. Bran, shorts, barley and tankage are excellent concentrates for brood sows. During pregnancy the sow must be well-fed but not fattened. After farrowing no feed must be given for from 36 to 48 hours. After this period she should be gradually brought to a full ration of nutritious milk-producing feeds. A combination of barley and shorts with alfalfa pasture has been found successful in Idaho.

During the last two years the Idaho station has tried out a number of concentrated feeds for fattening hogs. The combination found most successful consists of 2 parts barley, 4

parts shorts, and $\frac{1}{2}$ part digester tankage. In an extensive experiment last winter tankage used as a supplement to shorts and barley proved more economical than corn, peas or soybean-meal used in similar capacity. In preparing this ration the barley should be ground and the mixture fed wet. A 200-pound pig will eat from 7 to 8 pounds daily of this feed.

ILLINOIS.—By Prof. Wm. Dietrich of the Illinois Experiment Station, Urbana: One must familiarize one's self with the nature of the thing that is to be made, that is, the body of the hog, and, second, the source from which the material for the structure, that is, the feeds, are to be obtained. Pigs of all kinds need for proper development of their bodies various materials such as water, protein, carbohydrate, ether extract and mineral matter, all of which are supplied in greater or smaller quantities by the various natural farm feeds. Young and growing pigs need a larger quantity of water, protein and mineral matter than do mature hogs that are simply being maintained after having been developed. It is evident, therefore, that the feeding should be varied according to the age of the pigs in question. To take up the other side, feeds are classified as roughages and concentrates, and then according to the amount of the various nutrients, such as water, protein and carbohydrate, that they contain. Green feeds, such as clover, alfalfa, pumpkins and roots, that contain a large percentage of water, are called succulent feeds. Feeds that contain a smaller percentage of water, such as corn, oats, barley, middlings and soybeans, are called dry feeds. Feeds that are rich in protein, such as skimmilk, soybeans, peas, oilmeal and tankage, are classified as nitrogenous concentrates and the roughages; such as clover and alfalfa, that are rich in protein are classified as nitrogenous roughages. Skimmilk besides being rich in protein is also classified as a liquid, as it contains nearly 90 per cent water. In order to make up the best kind of ration for pigs it should contain the right combination of water, protein and carbohydrate, in accordance with the age of the pig and the purpose for which it is being fed. Mature brood sows need not be fed a very large quantity of protein, because they are not growing and need only enough for maintenance and for the production of the offspring. The latter need not be very great. A good ration for mature brood sows, therefore, can be made from a variety of carbohydrate feeds, such as corn, barley, oats and rye,

together with a considerable allowance of roughages, such as clover and alfalfa. The latter if available will supply an abundance of protein in such a case. Apart from this they should have the required amount of water. This factor will take care of itself during the summer season, if water is available. During the winter season, however, in cold climates there is a tendency for hogs not to drink water enough, consequently it must be fed in the form of a thin slop so that sufficient will be taken.

For about one week before and two or three weeks after farrowing the sow should be fed lightly. About a week before farrowing a decrease in the ration should be started, which should be continued up until farrowing time, when very little feed should be given. After farrowing the sow need have very little if any feed the first day. Beginning with the second day a light ration should be given which should be increased gradually during two or three weeks' time, getting a mature sow on full feed three or four weeks after farrowing and the young sow two or three weeks. After this time during the suckling period when the sow is producing a large quantity of milk a little more of the protein feeds should be given. Young sows should be fed the same as old sows, except that they should have a little more protein in their ration and possibly be fed a little more heavily. Boars are fed the same as sows, but it is sometimes a very difficult matter to keep them on feed, especially during service. Great care should at all times be exercised that all feeds are consumed before the individual, whether it be boar or sow, leaves the place of feeding.

Pigs usually learn to eat when they are four or five weeks old, and can be allowed to eat with their dams. The ration at this time should contain plenty of water, which will answer the purpose for both brood sow and pig. After weaning time the pigs should be divided. Those intended for breeding purposes should not be fed quite so highly as those intended for market. Furthermore, as the feeding period continues the market pigs should have less water than the pigs intended for breeding purposes. The only practical and scientific basis according to which pigs should be fed is the digestible nutrients that enter into the different feeds.

Young and growing pigs after weaning time need a comparatively large quantity of water. A practical solution of this problem, and without going into detail, is as follows: If all the grain

feeds used are ground into a fine meal and mixed with the required amount of water that pigs should have at this time, it will make a very thin slop of about the consistency of buttermilk. As the pigs grow older the amount of water should be reduced; those that are being fed for market should receive a slop of about the consistency of a thick mush when the pigs are eight months old and in prime condition. For those that are intended for breeding purposes the amount of water is not reduced to so great an extent and the slop will remain comparatively thin. Young and growing pigs also need a considerable quantity of protein. This being true, care should be taken not to feed them exclusively on carbohydrate feeds, but be sure to include a considerable quantity of protein feeds in the ration. The pigs should if possible have free access to either clover or alfalfa, but since these are roughages the pig cannot get enough of them into its small stomach to furnish the necessary protein for maximum growth. It is therefore necessary to add a small quantity of some nitrogenous concentrate like milk, soybeans, peas, oilmeal and tankage. This manner of feeding should be kept up during the growing period or until the pig is about six months old. During the last two months of the feeding period less protein, consequently less of the nitrogenous feeds, need be given, and relatively more carbohydrate feeds, such as corn, can be supplied to good advantage.

POUNDS OF FEED PER 100 POUNDS LIVE WEIGHT PER DAY.

Feeds.	Age of pig in months.						
	2	3	4	5	6	7	8
Ground corn (fine).....	2.6	2.8	3.0	3.2	3.3	3.0	2.6
Soybean-meal (ground fine).	.8	.9	1.0	.6	.8	.4	.4
Skim-milk	6.0	6.0	6.0	6.0	6.0	.0	.0
Water	6.6	5.1	3.8	2.6	1.4	5.5	4.0

It must be remembered also in this connection that one of the easiest ways to spoil a pig is to overfeed it on protein feeds. If a young pig during the third or fourth month of its life is given all the milk it can drink, it is undoubtedly overfed on protein, and will never thereafter make as good a feeder as it would had this not happened. The more highly concentrated

the protein feed, as for instance, soybeans, oilmeal and tankage. the more carefully it should be handled. It should be fed in such a manner that each individual pig of the bunch gets its portion of the feed. As a sample of a practical ration for pigs that are being fed from weaning time to eight months of age for market the tabulation on the preceding page is given.

This of course is only one set of combinations from an innumerable number that might be suggested, and only a few feeds out of a large number that are available.

INDIANA.—By Prof. F. G. King of the Purdue Experiment Station, Lafayette, Ind.: It is impossible to give a single ration that would produce both the most rapid and the most economical gains under all conditions. There are numerous combinations of feeds that will produce a ration of practically the same value, so far as rate of gain is concerned. On the other hand, the cost of these feeds varies so much that some years one combination may give the most economical gains while during other years another combination would prove the most profitable. Neither is it necessarily the case, however generally it may be true, that the ration that will produce the most rapid gains will also produce them most economically. With these facts in mind the rations themselves may be considered.

For the most rapid and economical gains on any class of hogs a good leguminous pasture is essential. The best pasture is clover when the heads are forming. This period in the life of clover pasture is so short, however, that it cannot be seriously considered. Alfalfa furnishes by far the best pasture for any considerable length of time. Growing clover is not far behind alfalfa. For a short time when the pods are ripening cowpeas or soybeans furnish a pasture superior to either alfalfa or clover, but it is the grain rather than the forage that produces the good results with these two plants.

The feeding of sows during pregnancy and the feeding of a breeding boar are so nearly the same that the ration to use for best results with one can be used with equal success for the other. The question of feeding, however, is so closely associated with that of management that it is hard to separate the two, and the ration that will be the cheapest will not necessarily be the most economical in the end. The most economical as well as the most desirable results can be obtained only when

good leguminous pasture is available. When such is the case, and the sows are mature, a ration consisting of 2 pounds of corn per 100 pounds live weight will give the most economical results, and be as good as costlier rations. If the sows are not mature the ration should be somewhat heavier and contain 8 per cent tankage or 12 per cent linseed oilmeal in addition to the corn. When in drylot the ration should consist of grain and what alfalfa or cowpea hay the hogs will eat. The grain ration should consist of 6 parts corn, 3 parts shorts and 1 part tankage in amounts varying from 2 to 4 pounds per 100 pounds live weight, depending on the age and condition of the animal. If no hay is available the ration should consist of $\frac{1}{3}$ corn, $\frac{1}{3}$ ground oats and $\frac{1}{3}$ shorts, into which mixture has been added 5 per cent tankage or 10 per cent linseed oilmeal. If milk is available 1 part of corn to 2 parts of milk will be equally desirable.

Pigs until they reach the weight of 100 to 125 pounds require a well-balanced mixed feed to give the most economical as well as the most rapid gains. A mixture of 2 parts of corn, 1 part of shorts and 6 parts of skimmilk will give the most satisfactory results, provided skimmilk is available. If the milk is not available a mixture of equal parts cornmeal and shorts to which has been added 8 per cent tankage will be most economical until the pig has reached the weight of approximately 60 pounds, when the proportion of cornmeal to shorts should be changed to make the proportion 2 parts of the former to 1 part of the latter, the percentage of tankage remaining the same. Weanling pigs will usually eat about 4.5 pounds of this mixture per 100 pounds live weight. The amount eaten in warm weather will be slightly less than this, and also the amount consumed per 100 pounds live weight will gradually decrease as the pigs get larger. The substitution of linseed oilmeal for tankage gives practically as good results, except that the amount of linseed fed will have to be twice as much as when tankage is used.

After pigs have reached the weight of 125 pounds the best ration to use depends primarily on the cost of feeds and the availability of pasture. Leguminous pasture is a requisite of the fastest and cheapest gains. On clover or alfalfa pasture the most rapid gains can probably be made with a mixture of corn 10 parts, shorts 5 parts and tankage 1 part, but in order for

this ration to be the most economical, corn must be worth more than 50 cents per bushel. With corn from 40 to 50 cents per bushel the best ration would be corn 15 parts and tankage 1 part or oilmeal 2 parts. With corn below 40 cents per bushel and supplementary feeds at present prices corn alone would give the most economical results. The amounts of the feed consumed daily per 100 pounds live weight will be about 4 pounds at the early part of the feeding period, to be gradually decreased as the hogs get fat. With a ration of corn alone slightly smaller amounts than of the mixed feed will be consumed.

When the hogs are in a drylot a mixture 6 parts of corn, 3 parts shorts and 1 part tankage will give best results, when corn is worth more than 50 cents per bushel; otherwise corn and tankage will be most economical. The amount of tankage fed daily should be $\frac{1}{4}$ of a pound until the hogs weigh 150 pounds, when it should be gradually increased to $\frac{1}{3}$ of a pound daily per hog with corn fed to the limit of the appetite. If skimmilk is available at 15 cents per 100 pounds a ration of 1 part corn to 3 parts of milk will give the fastest gains, but milk is not available for most hog feeders in the cornbelt.

IOWA.—By Prof. W. J. Kennedy of the Iowa Experiment Station, Ames: There is no one best ration for any class of animals. Locality and cost of feedstuffs are important factors. Every animal requires certain proportions of the various food nutrients to meet its needs. These proportions vary with the age and purpose for which the animal is kept. Economy is a very important factor in the ration of all market animals, but other things are fully as important in the case of breeding stock. The results of five years' work at the Iowa station in feeding weanling pigs for market and breeding purposes indicate that where good clover pasture, alfalfa pasture or mixed forage crops are available nothing gives much better results than the pasture, ear corn and plenty of pure water. This seems to furnish a very good balanced ration, all of which is home-grown. Where protein forage crops are not available, some form of protein supplemental feed, such as oilmeal, shorts or the packinghouse by-products, should be added to the corn ration. Pigs averaging 33.4 pounds on June 4, fed on ear corn and clover pasture till Oct. 8 and on ear corn 10 parts, meatmeal 1 part and clover pas-

ture till Nov. 16, made an average daily gain of 1.12 pounds at a cost of \$3.49 per cwt. Corn was 50 cents per bushel, meatmeal \$45 per ton and clover pasture \$6 per acre.

For pigs weighing 200 to 300 pounds soaked shelled corn 8 parts and meatmeal 1 part give good results in drylot feeding. This ration has produced very heavy daily gains and very economical gains. For pigs weighing 100 to 150 pounds during September and the early part of October the most economical gains have been secured by "hogging down" corn. A very good balanced ration was obtained on lots in which either cowpeas or soybeans had been planted with the corn. On these lots the gains were made at a cost of less than \$2.60 per cwt. Where corn alone was planted the addition of $\frac{2}{3}$ of a pound of meatmeal per pig per day gave very much better returns than where corn alone was fed. We heartily commend the practice of "hogging down" corn to every man producing hogs in the cornbelt. It is the most economical way to produce pork on an Iowa farm.

Brood sows during pregnancy should receive rations fairly rich in protein. This is especially true in the case of gilts or one-year-old sows. During the past three years a great deal of work has been done at the Iowa station along these lines. Corn alone and corn combined with some ten other combinations of feedstuffs have been used. One of the most satisfactory rations used, both from the standpoint of economy and the weight and strength of pigs produced, was composed of ear corn $7\frac{1}{2}$ parts and meatmeal 1 part. Five gilts fed on this ration farrowed 44 pigs. Vigor of pigs at birth: 41 strong, 2 medium, 1 weak. Condition of pigs at birth: 1 prime, 12 choice, 22 good, 7 medium and 2 fair. At weaning time, when the pigs were eight weeks old, there were 35 live pigs. The same ration was fed during the suckling period. It would have been better if the corn had been ground and soaked during the suckling period. This would have increased the palatability of the ration, and the sows would have eaten more. During the suckling period the more the sow eats of the right kind of feed the more milk she will give; hence the heavier the pigs.

The boar should be fed on a ration containing a liberal allowance of protein. Corn should not constitute more than half of the grain fed. A ration composed of wheat shorts 4 parts, corn 4 parts, and oilmeal 1 part is a good one. For a full-grown boar corn 3 parts, oats 3 parts, shorts 3 parts and meatmeal or

tankage 1 part will give good results. When the boar is fed a liberal protein ration and allowed plenty of exercise, and the sows are fed a ration similar to the one described, our experience indicates that the sows are much more likely to settle to the first service than when corn constitutes the whole ration or even three-fourths of the ration of the sows.

KANSAS.—By Prof. P. N. Flint of the Kansas Experiment Station, Manhattan: Just before weaning and after farrowing is a very critical period in a pig's life. It is easy at this time to stunt a pig by injudicious feeding and care. There is just as much danger in overfeeding a pig as in underfeeding, or in giving feed of an improper character. Whenever skim-milk is available it should be fed to pigs of this age because it furnishes nutrients for growth in a very palatable and nutritious form. Along with skimmilk, a concentrate ration composed of equal parts by weight of cornmeal and wheat middlings is resultful in producing growth. Better still is a ration composed of equal parts of cornmeal, ground oats (free from hulls), wheat middlings and skimmilk. If skimmilk is not available a mixture composed of 30 pounds of ground oats, 30 pounds of wheat middlings, 30 pounds of cornmeal and 10 pounds of oilmeal is excellent. The oilmeal keeps the digestive organs in good condition and imparts a healthy appearance to the skin and hair. The pigs should be started on this ration when three or four weeks of age, so that they will learn to eat before weaning, and if they are being developed for breeding purposes this ration may be fed until they reach a weight of from 250 to 300 pounds. However, it is more economical to provide alfalfa, bluegrass or clover pasture and feed about one-half of a full feed of the grain mixture. If the end in view is the production of pork, it is more economical to leave out the oats and oilmeal, after the pigs reach the age of three or four months, and feed a half of a full feed of the concentrates in addition to pasture until the finishing period begins. Perhaps the most economical ration for pigs that are being developed for the market is one of an alfalfa, bluegrass or clover pasture and a half of a full feed of ear corn until the pigs reach a weight of 150 pounds, after which they should be fed a full feed of ear or shelled corn, in addition to pasture or some of the legume hays. If it happens that the pigs have not made

a good growth on the pasture and corn ration, better results will follow, when fattening, to furnish a variety ration composed of a mixture of 62 pounds of ground corn, 30 pounds of shorts and 8 pounds of tankage. On account of the increased cost of producing gains after the 200-pound mark is reached, and also because pigs of that weight will bring top prices, it does not pay to feed them to a weight of 300 pounds or more. Even hogs that are being finished will usually make greater gains if fed some protein feed in addition to corn, and alfalfa or clover hay or pasture is perhaps the cheapest source of protein.

During pregnancy and after farrowing, the brood sow should be kept in good thrifty condition, but this condition should not be the result of heavy corn feeding. She needs protein and mineral matter to develop the foetus and young after birth, as well as to maintain her own body. Good pastures or legume hays should be the first consideration in feeding the brood sows because they furnish the nutrients in the cheapest form. Skim-milk holds the same important place as a feed for the brood sow that it does for the growing pig. A ration composed of equal parts of ground corn, shorts and bran should be fed in quantities sufficient to keep her in good thrifty condition. During the early stages of pregnancy the concentrate feeds may compose a very small part of the ration, say 2 to 4 pounds per day, depending on the quality of the pasture, but as farrowing time approaches the amount fed may be as high as 6 or 7 pounds per day. After farrowing, and when the pigs begin to take a great deal of nourishment, the concentrates may be increased to from 7 to 10 pounds per day, depending on the size of the sow and litter. In order to insure a good strong litter the sow and boar should be thrifty and in good condition at the time of service. The mistake is often made of keeping the boar in a small yard or pen. Whenever possible he should have the run of a pasture. During the breeding season he needs strength-producing feed and his ration should not be different from that of a brood sow during pregnancy. All hogs that are being kept in pens where there is not much chance to graze should be given access to boxes or troughs containing salt, charcoal, lime and bonemeal, and it is best if each of these is placed in separate compartments so that the animal can select according to its appetite.

Since conditions vary with localities, it is not necessary to feed exactly as here set forth. Roots may be substituted for bran, and barley, milo and Kaffir-corn may be substituted for corn. Cowpeas, soybeans and peanuts will take the place of any of the protein feeds to supplement corn. The great thing to bear in mind is that successful pork production means the utilizing of forage crops so far as possible.

LOUISIANA.—By Prof. W. R. Dodson, Director of the Louisiana Experiment Station, Baton Rouge: At the time the pigs raised for meat are weaned they are grazing with their mothers on fall-sown oats, for the fall litters, and on Bermuda for spring litters. We feed them rice polish at the rate of $\frac{1}{2}$ to 1 pound per day per pig, with a very small quantity of corn. Brood sows are maintained principally on Bermuda grass in the spring and summer, on oats in the fall and early winter, and red clover in the late winter and early spring. Boars are kept on Bermuda grass sod during the entire summer and fed a small quantity of rice polish, wheat bran and corn, varying the mixture and amounts to suit requirements. During the winter they have but little pasturage and are fed corn, rice polish and root crops. Fall litters of pigs go onto red clover about the middle of February, and are grazed on this crop until about June 1, depending on circumstances, and are fed approximately at the rate of 1 pound of corn per day for each 100 pounds of animal. From the clover they go onto Bermuda grass and are fed rice polish at the rate of 1 pound per day to each 100 pounds of animal. In August they go with March and April pigs onto cowpeas and corn grown together and allowed to eat at will. About Sept. 15 they go onto peanuts at will and are fed about $\frac{1}{2}$ pound of corn per day per 100 pounds of animal. About Nov. 1 the pigs go onto sweet potatoes and are fed rice polish, cottonseed-meal and corn at approximately the ratio of 2 parts of polish, 2 parts of corn, and 1 part of cottonseed-meal, feeding about $1\frac{1}{2}$ pounds per animal. The cottonseed-meal is not fed more than three weeks without an interruption, and the hogs are fed corn and polish only for about 10 days before they are put on the market. This gives us one set of hogs a little over a year old and one set about eight or nine months old, and permits us to furnish the maximum amount of the cheapest feed at the time they reach their maximum capacity of con-

sumption. Also it enables us to rotate crops so as to have something growing on the land almost continually both winter and summer. In this way we can produce from 600 to 1,000 pounds of pork per acre per year.

MARYLAND.—By Prof. A. L. Stabler of the Maryland Experiment Station, College Park, Md.: Wheat middlings is an excellent feed as the basis of a ration for young pigs. Where the pigs can run on pasture, and milk is available, a slop made of 1 to 3 pounds of milk for each pound of middlings is a suitable mixture. If no milk is at hand we may expect to get good results by feeding 1 pound of linseed-meal to 6 pounds of middlings mixed with water to make a thick slop. Brood sows which are pregnant should above all have some succulent feed which may well be grass or roots. An orchard where they have pasture and get the windfalls is an ideal place. A light ration of 1 pound of bran to 1 pound of middlings fed as slop in sufficient quantity to keep the sows gaining weight will be found a simple but good combination. If desired corn may be fed but should be given sparingly. When a sow is on full feed after farrowing a good mixture is the following: 3 pounds each of cornmeal and middlings, and 1 pound each of bran and linseed-meal. The boar's feed may be similar to that for pregnant sows. During periods of service the proportion of middlings should be increased. For fattening shotes the following are all good: corn with pasture; corn, 2 pounds and middlings and linseed-meal each 1 pound; or corn, 8 pounds and tankage 1 pound. Pasture, either of legumes or other grasses, and dairy by-products make valuable additions to any of these rations. Always give hogs charcoal, ashes and salt.

MICHIGAN.—By Prof. R. S. Shaw, Director of the Michigan Experiment Station, East Lansing: It is well to have weanling pigs on feed before separation from their mothers. Begin by offering some sweet skimmilk in a separate inclosure at three or four weeks of age; then begin to add a little middlings, gradually increasing the amount till 1 pound is used along with 3 or 4 pounds of milk. After a few days add cornmeal until that and the middlings are used in equal proportions. Later corn may be fed whole. If skimmilk is not available, add 1 pound of tankage to each 5 pounds of middlings and

cornmeal and add water. Skimmilk is very desirable for the start at least.

The best place for the pregnant brood sow in winter is in the barnyard working over the manure for her living in part, unless there is too much corn in the manure, or the yards are too crowded with animals likely to injure her. The general farmyard is of course preferred to the feedlot. In addition to feed thus secured, supply a suitable quantity of a mixture in equal parts of bran, ground oats and corn or wheat or barley. She will relish in addition a few mangels, carrots or beets daily. During the summer she should procure her maintenance feed from forage crops, such as clover, alfalfa and rape. The feed mixture already given may be used in such quantity as conditions require.

During early life, the boar should have as much freedom as possible and suitable feed to produce a strong, vigorous, growthy condition devoid of fat. Prior to and during the breeding season provide some succulent feed if possible as green clover, alfalfa or roots. For concentrates middlings or bran, ground oats and ground wheat make a very desirable combination mixed in equal parts.

Shotes may be finished on corn, barley or wheat in a combination with a nitrogenous concentrate such as tankage, forming at least one-tenth of the ration. Of the three grains corn is preferable because of its greater palatability. It is hard to keep hogs on a long feed successfully, when wheat or barley forms the bulk of the ration. When these grains are used it is desirable to mix them with corn where possible.

MISSOURI.—By Prof. F. B. Mumford, Director of the Missouri Experiment Station, Columbia: We have found a mixture of 6 parts of corn to 1 of linseed oilmeal to be a very satisfactory grain ration for weanling pigs on rape, alfalfa or clover pasture. The same ration may be fed to brood sows during pregnancy and at farrowing time. The cost of feeding pigs and sows may be reduced about one-half by depending largely on clover, rape or alfalfa pasture. It is not too much to claim that when pork is 5 cents a pound and corn 50 cents a bushel it is not profitable to feed hogs in a drylot. It may be very profitable to feed the same hogs under similar conditions if on pasture. The most profitable ration that has been fed at this station to fattening

hogs has been shelled corn, fed to hogs weighing from 100 to 200 pounds on clover pasture. We have determined that the most economical method of utilizing the clover and corn is to feed just enough corn to cause the hogs to gain $\frac{3}{4}$ of one pound each per head per day. If fattening hogs weighing 100 pounds each at the beginning are to be pastured on clover the amount of corn fed during May and June should be 2 pounds per day per head, during July 3 pounds and during August 4 to 5 pounds per head per day.

MONTANA.—By Prof. Frederick B. Linfield, Director of the Montana Experiment Station, Bozeman: In our northwestern mountainous country there are certain natural conditions which in a measure determine the feeds we can give to our stock. In the higher valleys particularly corn is not a profitable grain crop, but barleys, both the brewing and hulless varieties, do very well. The only grain by-products are shorts and bran. Alfalfa and the clovers do well, and so do roots of various kinds. Barley will vary from 80 cents to \$1.25 per 100 pounds. Bran and shorts will vary from 90 cents to \$1 per 100 pounds. On this basis of local food supply our best ration for weanling pigs is shorts and skimmilk, fed in the proportion of 1 pound of shorts to 4 or 5 pounds of skimmilk. As the pigs increase in size ground hulless barley may be substituted for a part of the shorts. For brood sows during pregnancy and after farrowing the method of feeding during the winter has been to give plenty of roughage, as roots and alfalfa hay, with a light grain ration, sufficient to keep the sow in a good thrifty condition with ample flesh, but not fat. After farrowing the grain is increased, usually feeding a mixture of barley, bran, shorts and some skimmilk, if available. Roots and alfalfa are provided as a side dish. In the summer the ration is not very different from that of the winter, except that pasture is substituted for the roughage. The boars are fed very similarly to the sows, giving them plenty of roughage, as alfalfa and roots, with enough grain (barley, bran and shorts) to keep them in good condition.

In fattening shotes our experience has been that an exclusive grain ration was not satisfactory. In addition to the grain some supplemental feed was needed to get rapid and economical gains. Skimmilk with grain has given us the best returns. Next to this come pasture and roots, and if they are not avail-

able we use alfalfa or clover, both of which are dependable crops in various parts of the state.

We have usually fed about 3 pounds of skimmilk to 1 pound of grain, though to the larger hogs the proportion of grain to 2 parts of skimmilk is frequently a mixture used. The grain fed is usually ground barley, bran and shorts, the proportions varying with the price, but usually one-fourth to one-half of the ration of the bran and shorts. With this ration the hogs weighing 150 pounds usually eat from 5 to 6 pounds of grain a day and 12 to 15 pounds skimmilk, and they will gain from $1\frac{1}{2}$ to 2 pounds per day, using about 3 pounds of grain and $8\frac{1}{2}$ pounds of skimmilk for each pound of gain.

In feeding roots or alfalfa the animals are permitted to eat what they will of them, and we give them at the same time all the grain they will eat. A 150-pound hog will usually eat 5 to 6 pounds of grain a day, about 1 to $1\frac{3}{4}$ pounds of roots, and 1 to 3 pounds of alfalfa. It will gain from 1 to $1\frac{3}{4}$ pounds per day, and requires about $3\frac{3}{4}$ pounds of grain and 1 to 2 pounds of roots or 1 to $2\frac{1}{2}$ pounds of alfalfa for each pound of gain.

NEBRASKA.—By Prof. E. A. Burnett, Director of the Nebraska Experiment Station, Lincoln, Neb.: The mature sow is generally fed too much rather than too little during pregnancy, especially in winter. Some corn may be fed, but it should not be the principal ration. Mature sows turned on alfalfa pasture after weaning their litter will gain about $\frac{1}{2}$ pound per day on pasture alone. If they are not to farrow fall litters this is quite sufficient, and they will come up to breeding time in the fall in the best possible condition. The farmer with alfalfa hay of good quality has the problem solved. Here is the programme: One bushel of shelled corn daily for about 15 brood sows and all the good alfalfa they will eat, a field of winter wheat or rye, a dry bed, and room for exercise. Watch the herd and vary the ration so that they will come to farrowing time in nice smooth condition. Farmers not favored with high-grade alfalfa hay should feed light grain rations of oats, shorts and corn—not more than half corn. Whole grain should be fed on a feeding floor and not wet in a trough, as hogs bolt whole grain and do not properly grind it when fed wet in a trough.

At the North Platte station brood sows were wintered in

1909 and in 1910 on 10 bushels of corn and 600 pounds of alfalfa hay each, from Nov. 1 until farrowing time, or about 2 bushels of shelled corn daily for 25 brood sows. The hay was fed in racks. These sows gained 112 pounds during the winter, and weighed 430 pounds at farrowing. They farrowed an average of 9.8 pigs and weaned an average of 6.5 pigs. These pigs were brought to a weight of 50 pounds at a cost of \$2.25 each or \$4.50 per 100 pounds. This, however, is above the average cost of pigs at 50 pounds. When both old and young sows are included this cost has been about \$2.13 each, or \$4.26 per 100 pounds.

Gilts must be fed more generously. From breeding time to farrowing they should receive nearly a full ration, but this should be made up of such feeds that they will not become over-fat. At our North Platte station in 1909 and 1910 25 gilts were bred each winter, and were fed a ration of $\frac{1}{4}$ chopped alfalfa hay and $\frac{3}{4}$ grain. The grain was one-half barley and one-half corn. They got 3 pounds daily for each 100 pounds of their live weight. In January the ration was decreased, because the pigs were getting too fat. These gilts came to farrowing time weighing 310 pounds each, farrowing an average of eight pigs and weaning six pigs each. They were fleshy enough to have gone to market, but had no corn fat on them and none of them suffered from over-fatness. They shrank 39 pounds each while suckling.

After farrowing, the sow should have no heating feed for several days—nothing but water for the first 24 hours, but plenty of water to allay fever. A warm house in which the pigs do not chill is important. Most sows are best let alone and not worried by an attendant. The pen should have guards to keep the sows from lying on their pigs. Cut the bedding if possible and use but little. Feed only a light ration for two or three weeks. At the slightest appearance of scours or of thumps cut the feed off from the sow. As a ration, use shorts 50 pounds, ground barley or corn 40 pounds and 10 pounds of oilmeal to make 100 pounds of feed. Add shelled corn after two weeks and increase it when the pigs begin to draw heavily on the sow. Do not limit the feed of the sow during the latter part of her suckling period. Our records show that the cheapest pork is produced while the pig is sucking, and it should be given a good start and a full dinner pail. Do not hurry to wean it unless

you must rebreed the sow. Pigs which suck 12 weeks have an advantage over those which suck eight weeks. When ready to wean the pigs should be eating a full ration from their own troughs. Take the feed away from the sow, and allow her to go dry before completely shutting the pigs away; then take the sow from the pigs and give her good pasture. After she has recovered a little from the heavy strain of suckling the litter, cut off all grain. She doubtless feels like the mother of many a large and hungry brood. She is ready for a long rest. Only mature sows should raise two litters per year, and when required to do this some grain should be fed continually and the sow kept in higher flesh than where she raises but one litter.

NEW HAMPSHIRE.—By Prof. J. C. Kendall, Director of the New Hampshire Experiment Station, Durham, N. H.: The brood sow should be compelled to take exercise. Her feed should be such as to keep her in good flesh, not fat, and to supply a sufficient amount of proteids to make possible a full and proper development of the foetus. Just before farrowing the sow should be in sufficient flesh and condition to withstand the unusual strain of farrowing, and the subsequent feeding of her litter with the least tax to her constitution. The feed supply should be reduced in quantity just previously to farrowing, and be of a laxative nature, such as is to be found in roots, small amounts of alfalfa grass or hay, wheat bran or small amounts of linseed-meal. For a day previously to farrowing the sow should receive only a thin slop of wheat middlings. The first two or three days after farrowing the sow should be fed sparingly of some appetizing feed like skimmilk containing some bran or preferably wheat middlings or ground oats. If possible the sow should receive skimmilk after farrowing and liberal quantities of middlings, ground oats, cowpeas, oilmeal or other milk-stimulating feeds. They must be liberally fed at this time or the young pigs will not thrive.

During the growing season a cheap and efficient ration may be made up of about 2 pounds of grain per cwt., consisting of $1\frac{1}{2}$ pounds of cornmeal or its equivalent of ear corn and $\frac{1}{2}$ pound of wheat bran or middlings, the rest of the feed to be derived from clover, alfalfa or other leguminous pasture. During the winter the brood sow may be fed per 100 pounds of live weight, 8 pounds of skimmilk and 3 pounds of cornmeal, or $1\frac{1}{2}$

pounds of cornmeal and $2\frac{1}{2}$ pounds of middlings as slop, supplemented with roots and cut alfalfa or clover hay.

When not over three weeks old the pigs should be encouraged to eat by providing them with a little whole milk or skim-milk containing some ground oats or middlings in a small shallow trough accessible only to them. The weaning should be a gradual process for the benefit of both the pigs and sow. There is nothing better for young pigs than skimmilk to keep them growing and in a healthy condition. Feed not over 4 pounds of skimmilk to 1 pound of grain and not over 3 pounds to 1 pound of grain when on good leguminous pasture, grain to consist of 2 parts cornmeal and 1 part wheat middlings. Grass should be supplied for summer and leguminous hay, roots or silage, during winter. Plenty of exercise for the growing pigs is essential at all times.

Shotes should be so grown that they will be in the best of health when the forcing season arrives. They should possess good digestion and a strong healthy muscular framework upon which to construct the finished carcass. Sixty days in which to condition the hog should be a sufficient time if properly done. Restrict exercise, decrease gradually all bulky feed, reduce the amount of protein feed and increase the amount of carbohydrates. Grain should be ground and in such condition that it will require the least energy possible to digest it. Pouring boiling water on cornmeal or corn and cob meal makes one of the best and most economical feeds for putting fat on a hog. Feed as much as the animal will eat three times a day; provide charcoal and salt where the hogs may eat it at will.

Boars should be fed and cared for in much the same manner as brood sows. It is of the utmost importance that they take plenty of exercise and do not become too fat. A summer ration should consist of pasture or other green feed supplemented with the grain mixture of wheat bran, shorts and cornmeal equal parts by weight, amount to depend on the kind and quality of pasture. Boars should be provided with warm comfortable quarters with yard adjoining where they should be compelled to take exercise. Succulent feed should be supplied in the form of roots, clover or alfalfa hay. If plenty of roughage of a leguminous nature is supplied $1\frac{1}{2}$ pounds of cornmeal and $\frac{1}{2}$ pound of wheat middlings in the form of a soft

warm mash, per 100 pounds of live weight, should keep the boar in good condition.

NEW YORK.—By Prof. H. H. Wing, Cornell University Experiment Station, Ithaca: For weanling pigs we consider the ideal ration skim milk supplemented with cornmeal and wheat middlings. If the pigs have been well suckled they will do very well on 1 pound of the grain mixture to 8 or 10 pounds of milk. As the pigs increase in size the proportion of grain may be increased until, when the pigs weigh 100 pounds, they can use economically 1 pound of grain to 5 pounds of milk. If the pigs are to be fattened for market, for fancy, light pork, the grain mixture should be: equal parts by weight of cornmeal and middlings, up to the time the pigs weigh 50 pounds, and after that clear cornmeal can be used. If the pigs are to be grown to a large size or are to be raised for breeding stock the proportion of wheat middlings should never be less than $\frac{1}{2}$, and it may be from $\frac{2}{3}$ to $\frac{3}{4}$ by weight. The ideal ration for brood sows before farrowing is to furnish them enough good clover or alfalfa hay so that the part that remains uneaten will afford them ample bedding. In addition to this they should have what they will eat readily of mangels or carrots, and this may be supplemented with sufficient grain to keep the sow in good thrifty condition. A good grain mixture is 60 pounds of wheat middlings, 30 pounds of cornmeal and 10 pounds of linseed oilmeal. After farrowing, the sow should have a slop and, if it is available, there is nothing better than skim milk for this. If skim milk is not available the same grain mixture that was used before farrowing can be used, made into a slop thin enough so that it will run freely. For service boars the grain mixture recommended for sows can be used, but it is not nearly so necessary or even desirable that boars should have so much sloppy feed, and it is perhaps desirable that they should eat their grain dry or nearly so, and drink what water they need by itself, taking care that the bowels are kept in good condition. For fattening shotes there is nothing better than cornmeal and skim milk, using 1 pound of cornmeal to 4 or 5 of skim milk, fed with great regularity all the animals will eat up clean three times a day. If skim milk is not available, 10 pounds of digester tankage to 100 of cornmeal or 70 pounds of cornmeal, 20 pounds of wheat middlings and 10 pounds of linseed oilmeal will make a satisfac-

tory ration, except that the oilmeal should be cut out for at least three weeks before slaughtering. I do not believe that the skillful feeder of swine can depend on weighed amounts of feed, since the individual capacity of hogs varies widely, and since they grow and develop rapidly. The rations given are of course intended very largely for New York conditions, where hogs are kept confined or in rather small yards and where skimmilk rather than corn forms the basal ration.

NORTH CAROLINA.—By Prof. R. S. Curtis of the North Carolina Experiment Station, West Raleigh: In the southern states the methods used in feeding weanling pigs, breeding stock and fattening hogs are not radically different from the methods and feeds used in other sections of the country. This is especially true as to weanling pigs. The large breeders and feeders especially of pure-bred swine use a ration for weanling pigs composed of cornmeal, wheat middlings and in certain cases digester tankage and skimmilk, when it can be obtained at a reasonable figure. The ration used on the experiment station farm for weanling pigs consists of cornmeal $\frac{1}{2}$ pound, wheat middlings $\frac{1}{2}$ pound and tankage $\frac{1}{8}$ of a pound, the whole mixed with water or skimmilk, if it can be obtained. Soaked wheat can be used to good advantage, and later corn, when the pigs are large enough to crack it. It is the aim always to furnish pasture, such as rye, oats, rape, or the latter two combined, cowpeas, soybeans and vetch. A large variety of these green crops can be grown, the kind depending on local conditions.

Brood sows during pregnancy are fed with a mixture of cornmeal 2 pounds, wheat middlings 1.25 pounds, wheat bran $\frac{1}{2}$ pound and linseed meal $\frac{1}{4}$ of a pound. This ration will supply a large mature sow. Pasture such as already suggested is given in connection with this ration, also a small amount of ear corn. After farrowing this same ration is used. It is increased gradually, however, to 7 or 8 pounds, depending on the size of the sow and the number of pigs farrowed. Boars prior to service are fed the same ration as the brood sows prior to farrowing. During service the quantity of the ration is increased about one-half.

Fattening shoters, weighing from 200 to 300 pounds, can be fattened on a ration of 6 pounds of ear corn, $\frac{1}{2}$ pound of tankage, and grazing crops such as peanuts, mature cowpeas or soy-

beans and sweet potatoes. This ration has been used very successfully. There is a great variation in the kind and quantity of feeds used throughout the state. Much depends on the financial condition of the farmer, and the number of hogs kept. Where only a few hogs are raised for fattening purposes, kitchen refuse, grazing crops and corn largely are used. With the breeders of pure-bred stock, however, more of the wheat by-products, tankage and skimmilk are used.

OREGON.—By Prof. James Withycombe, Director of the Oregon Experiment Station, Corvallis: A weaning pig should have 6 pounds of some grain equivalent, preferably middlings, to each 100 pounds live weight. A better ration, if available, would be 4 pounds of grain and 10 pounds of skimmilk, or $\frac{1}{2}$ pound of tankage to each 100 pounds live weight. Brood sows will do well on good pasture of clover, alfalfa, rape and the like for the first two months of pregnancy without grain; the next month pasture should be supplemented with 1 pound of grain for each 100 pounds live weight; during the last month 3 pounds of grain for each 100 pounds live weight. During the first week after farrowing they should be fed lightly, then gradually increase the feed up to 4 pounds of grain to each 100 pounds live weight.

Boars while growing and during service should receive 5 pounds of grain for each 100 pounds live weight.

Fattening shotes will require approximately 5 pounds of grain for each 100 pounds live weight. Supplemental feed of skimmilk or tankage will be very helpful.

PENNSYLVANIA.—By Prof. W. A. Cochel of the Pennsylvania State College, State College, Pa.: A profitable brood sow is almost invariably quite thin when her pigs are weaned, even when heavily fed. In order that she may produce large litters it is advisable to have her gaining in weight when bred, and to continue this development throughout pregnancy. Care should be used to see that she does not become too fat and inactive, which will cause her to kill her pigs, either by accident or design, at farrowing time. During summer a good clover or alfalfa field wherein there is an abundance of shade and water would be an ideal place for her. At this time she should be given a sufficient amount of corn to get her in best possible condition for farrowing. In winter it is a problem to feed in such manner as to

satisfy her appetite without causing her to become too fat. An excellent method is to feed from 1½ pounds of bran or middlings, with access to all the bright clover or alfalfa hay cut at an early stage which she will consume. Add to this a sufficient amount of corn to get her in proper condition for farrowing. After farrowing she should not be given anything but water for 24 to 36 hours, when a thin slop of bran and middlings should be fed for a couple of days, after which corn may be added. At the end of two weeks she should be given a full feed of a ration made up of equal parts by weight of corn, bran and middlings, which may be continued until the pigs are weaned. Any evidence of scouring on the part of pigs should be regulated immediately by reducing the feed of the sow.

Corn is undoubtedly the most efficient and generally the cheapest feed that can be used for fattening purposes. Its deficiency in both protein and mineral matter is easily overcome by the use of feeds rich in these ingredients. The results secured at various experiment stations throughout the United States indicate that skimmilk is the best supplement to corn for fattening purposes. The amount of supplement used should be governed by the age and condition of the hog and the supply of milk. Young hogs or those that are very thin should be fed approximately 10 gallons of skimmilk to each bushel of corn; as they fatten the proportion of milk should be reduced to 6 or 7 gallons per bushel of corn. Under ordinary farm conditions, exclusive of dairy sections, such a ration is impracticable. If buttermilk can be secured regularly it will make the next best supplement and should be fed the same as skimmilk. When neither of these by-products is available tankage or meat meal containing 60 per cent protein is the most efficient supplement at prevailing prices. It should be fed at the beginning of the feeding period at the rate of 6 pounds per bushel of corn. The proportion of corn can be increased as the hogs fatten until only 4 pounds of tankage is fed to each bushel. These rations are recommended for drylot or winter feeding. In summer when there is an abundance of clover the amount of supplement can be reduced one-half, as the forage crops will largely replace it.

The feeding of spring litters is comparatively simple when the object in view is to grow stock hogs for late fall and early winter feeding. If a good clover or alfalfa pasture is available they can be allowed to graze at will and be given a limited

amount of corn to keep them in proper condition, thus making their growth on very cheap feed. When they are to be grown and fattened at the same time it is necessary not only to increase the corn fed but also to furnish protein in some concentrated form. If skim milk is used from one-half to three-fourths of a gallon per head daily is sufficient, up to 100 pounds live weight. When this is not available from $\frac{1}{5}$ to $\frac{1}{6}$ of a pound of tankage would be satisfactory or $\frac{3}{4}$ of a pound of middlings per head daily in connection with what corn they will eat will make a very satisfactory ration on grass. With fall litters the amount of feeds rich in protein would have to be about doubled when the pigs have no access to leguminous forage crops. Unless there is some reason to believe that hog values will be much higher the following summer it is impracticable to attempt to grow fall litters on concentrated feeds. It is better to increase the quantity of feed in order to both fatten and grow them at the same time. Where growth without fat is made profitably it is made on cheap feeds.

The feeding and handling of a herd boar in such manner that he may be active, eager for service and not become either too fat or too thin is one of the most difficult problems which the stock-farmer must solve. In the first place he should have the opportunity to take an abundance of exercise. This is best accomplished by giving him a large lot with housing facilities as far from the feeding trough as possible. If it is convenient he should be allowed the company of a number of young pigs of the same sex which will help him in securing exercise. He should be brought up to rather high condition on feeds rich in protein and full of succulence. If possible have a leguminous crop in his lot and feed $\frac{1}{4}$ pound of tankage, from 2 to 4 pounds of middlings and a limited amount of corn, according to the size and condition of the individual. Skim milk can be used to replace the tankage where available and will make a better ration. These feeds can be used during the breeding season, after which the ration should be reduced to such a point that he will not increase too rapidly in flesh during the idle season.

TEXAS.—By Prof. J. C. Burns of the Texas Experiment Station, College Station, Tex.: One of the most effective and as a rule economical rations for weanling pigs, those from two to three months old and weighing from 50 to 60 pounds each, con-

sists of 1 pound cornmeal, 1 pound wheat shorts or middlings and about 6 pounds of skimmilk or buttermilk. It is well thoroughly to mix the grain feeds together and allow them to soak in the skimmilk or buttermilk for about 12 hours, thus making a thick slop. The pigs, particularly if intended for the open market, should receive about as much of this mixture as they will clean up readily twice or three times daily, the amount necessarily increasing with their weight. As they approach the 100-pound mark, soaked, shelled or ear corn may be gradually substituted for the cornmeal and a part of the shorts or middlings, making the ration for each pig about 3 pounds of corn, 1 pound of wheat shorts and about 12 pounds of skimmilk or buttermilk.

Shotes from five to six months old and weighing from 100 to 125 pounds are in nice shape to finish at 8 to 10 months old weighing from 200 to 300 pounds. Some excellent rations for this purpose may be mentioned, each being stated approximately for 100 pounds of live weight:

(1) 4 pounds of corn and 12 pounds of skimmilk or buttermilk; (2) 3 pounds of corn and 1 pound of wheat shorts or middlings; (3) 4 pounds of corn and tankage or meatmeal in the proportion of 9 pounds of corn to 1 pound of tankage or meatmeal; (4) 4 pounds of rice-bran or rice polish and tankage or meatmeal in the proportion of 9 pounds of rice-bran or rice polish to 1 pound of tankage or meatmeal; (5) 2 pounds of corn and cowpea or peanut pasture; (6) 3 pounds of corn or Kaffir-corn or milo maize and alfalfa pasture. It would be well to soak the grain of each of these rations in water (or milk when it is used) about 12 hours, as by so doing the feeding value is usually increased. The tankage or meatmeal should not be soaked, but mixed thoroughly with the grain at the time of feeding. The economy of feeding these different rations will of course depend largely on the locality in which the feeding is done. For instance, in the ricebelt region of the southern states, rice-bran and rice polish may be often substituted for corn with profit. They have been found to be practically equal pound for pound to corn for the production of gain and are usually lower in price. It will be well to state, however, that the quality of the pork of straight rice-bran-finished hogs is inferior to that of corn-finished hogs, as indicated by a soft, oily texture. This

defect can be prevented by substituting corn for one-half of the rice-bran in the ration.

The brood sow during pregnancy must not only have feed to keep her own body built up, but also properly to nourish and develop the young she carries. She can be most cheaply maintained on pasture with some grain, as for example 2 pounds of corn per 100 pounds of live weight, and clover or alfalfa or rape pasture. Oats, wheat, barley, rye, Bermuda grass and sorghum afford good pasture, but with any of these some concentrated feed rich in protein, such as wheat shorts, middlings, skimmilk, buttermilk, tankage, or meatmeal, should be fed in addition to corn. On such pastures the rations may be proportioned in about the same way as recommended for fattening shotes, and the daily amount of grain necessary for a sow in average condition will be from 2 to 2½ pounds per 100 pounds of live weight. The same feeds may be used for the sow after farrowing, except that on account of milk production the ration should contain a larger proportion of one of the protein feeds, and should be gradually increased in amount until a sow in average condition is receiving from 3 to 4½ pounds of grain per 100 pounds of live weight, depending on whether she has access to pasture and what kind of pasture. Rations would be about right in which the feeds are proportioned as follows: (1) 1 pound of corn to 4 or 5 pounds of skimmilk or buttermilk; (2) 2 pounds of corn to 1 pound of wheat shorts; (3) 8 pounds of corn to 1 pound of tankage or meatmeal.

Prior to service the boar should be fed and handled in practically the same way as recommended for the brood sow before farrowing. As the breeding season approaches the quantity of concentrated feed should usually be increased, as it is important that the boar be in good flesh and strong and vigorous during the period of service.

VIRGINIA.—By Dr. N. S. Mayo of the Virginia Polytechnic Institute, Blacksburg: Here we consider green forage an important ingredient in a ration for breeding sows, boars and growing pigs. The exercise they get in foraging is an important factor. For weanling pigs 15 pounds of oilmeal, 60 pounds of middlings, 20 pounds of shelled corn and 5 pounds of tankage mixed with skimmilk is an excellent ration. For a brood sow suckling pigs I would add 10 pounds more of corn and only 50

pounds of middlings and feed wet with skimmilk or good dish water. I would keep shotes intended for fattening growing every minute, putting them on a soybean or cowpea pasture and giving them some corn in addition, then gradually changing them to a ration composed of 80 pounds of corn, 10 pounds of middlings and 10 pounds of tankage. When on full feed they should have but little range. In all cases an abundance of fresh water should be supplied, also salt, coal, charcoal and wood ashes. I would utilize natural pasture and forage crops to the utmost and aim to market fat hogs at 225 to 250 pounds.

Boars and sows for breeding purposes I would try to keep in moderate flesh but thrifty. I do not like clean, coarse, western bran for hogs, preferring country mill bran, or middlings. A little tankage or similar animal feed added to any hog ration is economical. A variety of feed is important. The animals should be closely watched, and if they do not do so well as they ought, we try to mix more brans with the ration.

WISCONSIN.—By Prof. James G. Fuller of the Wisconsin Experiment Station, Madison: We have secured uniformly satisfactory results at the Wisconsin station the last few years by feeding weanling pigs the same ration as that fed to their mothers while the pigs are sucking. There are two distinct advantages in this plan: (1) It avoids digestive troubles that often result from feeding little pigs on rich rations specially prepared. (2) It saves the trouble of preparing and handling extra mixtures of feed. Young pigs before weaning feed with their mothers in the same trough or in creeps near by, and when weaning-time approaches the allowance for the pigs is increased and that for the sows gradually cut down. Our nursing sows are fed liberally on a thick slop ration composed of equal parts of cornmeal, ground oats and flour middlings, with about 6 pounds of oilmeal for every 100 pounds of the grain mixture. The liquid part of the ration is usually water. When skimmilk is available for part of the liquid, the amount of oilmeal fed is cut down to 2 or 3 pounds per 100 pounds of mixed feed.

Growing pigs after weaning continue to get this same ration in connection with pasture and rape. Pigs like a variety of feed, and for rapid growth and fattening we feed in addition about all the corn they will clean up. If the corn is hard we soak it 10 or 12 hours before feeding. There is but little danger

in giving young pigs too much corn, when it is fed in connection with the slop ration already described. We plan to get the pigs gradually onto new corn in the fall, and during the latter stages of fattening the slop ration is cut down and more new corn fed to good advantage.

Our boars prior to and during service are fed the slop ration described, with two or three ears of corn per day. They have a grass paddock to exercise in, and we plan to keep them muscular and not fat. The last few years we have experimented with several different rations for pregnant sows. The sows that give the best results with their litters this last spring were fed on a slop ration composed of equal parts of cornmeal, wheat middlings and wheat bran. Their average weight during pregnancy was a little over 350 pounds and they were fed on the average $3\frac{1}{2}$ pounds of feed per day.

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